

COMPUTERWORLD

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Crystal ball

Profile
of International
Data Corp./77

Moving beyond relational software

Special Report
on data base
management
systems

Follows ID/16

In Depth

Will you be the
next CIO?

Follows 50

IBM launches multiproduct blitz

Announcements reveal moves to integration

By Peter Bartolik
CW Staff

If an overload of products is a contributing factor to the current computer industry slump, IBM's announcements did nothing to ease the problem.

ANALYSIS

With the release of a desktop version of the System/36, three Personal Computer AT versions of the 3270 Personal Computer and realignment of both the System/36 and 38 product families, users have yet another mass of product specifications to swallow. And if that isn't enough to chew on, AT&T is expected to unleash today its own volley of announcements.

Through the 237 pages of technical specifications that IBM issued describing its announcements, some strategies and directions are becoming more evident.

■ Mainframes may still be the mainstay of IBM's business strategy, but last week's announcements underscore the fact that the No. 1 computer vendor recognizes that its future growth hangs on moving — or communicating — the back room processing power to desktops.

In just a few tumultuous years, the once-maligned IBM Personal Computer has traveled, philosophically, from a fringe position as an entry system to a crucial role on IBM's product chessboard.

See **ANALYSIS** page 5

Adds desktop version to System/36 family

By Eric Bender
CW Staff

RYE BROOK, N.Y. — IBM last week let loose a barrage of product announcements, price cuts and improved product delivery dates affecting virtually every major product line the company offers.

In all, IBM made 60 separate announcements. Industry analysts said they believe many of the products had been planned for introduction later in 1985 and early in 1986 but were accelerated

after it became clear that the sluggish sales IBM reported in the first half of 1985 will persist.

Headlining the product debuts was the System/36 PC, which combines a slimmed-down System/36 with a directly attached Personal Computer and supports up to four workstations. Big Blue also announced memory upgrades for other System/36 models.

Designed for small business and departmental applications, the System/36 PC is based on the new 5364 processor, a desktop or floor-standing unit said

to run existing System/36 application programs without recompilation. For the three additional workstations, users can choose among Personal Computers equipped with terminal emulation; 3180, 5250 or 5290 family terminals; and several workstation and Personal Computer printers.

See **BARRAGE** page 10

Other announcement highlights

■ More than 30 software announcements, including packages that make the System/38 a component of IBM's Office Systems architecture (story page 4).

■ A new member of the System/38 family, the Model 18, which replaces the Model 8 and features a higher density multi-chip logic module (story page 4).

■ Across-the-board price cuts on virtually all large and mid-

range systems. Affected products include the 3080 and 4300 series CPUs and the mid-range System/38 and 36 lines (story page 6).

■ Six workstations, including three AT versions of the IBM 3270 Personal Computer, a graphics terminal for IBM mainframes and two Ascii terminals that can be used with either IBM systems or those that other vendors manufacture (stories page 6).

DG posts first loss, lays off 1,300

Joins ranks of vendors ailing from sales slump

By Clinton Wilder
CW Staff

Data General Corp. led the parade of continuing bad news in the computer industry last week with its announcement of 1,300 layoffs, the first companywide dismissal in its 16-year history.

The Westboro, Mass.-based minicomputer maker said it will post its first operating loss ever in the current quarter ending June 29 and may lose money in the next quarter. DG also said its previously announced U.S. plant shutdown, planned for July 1-3, would be extended to include the week of July 8-12, and it left open the possibility of further temporary shutdowns during the remainder of 1985.

"We were geared up for much more demand this year," DG President Edson D. de Castro said of the layoffs, which cut the company's worldwide work force by 7%. "This represents an attempt to get costs in

line with demand. It was a very tough decision and clearly something we did not want to do."

DG's dramatic action marked the industry's third straight week with a four-figure layoff announcement by a major computer vendor. Previously, Wang Laboratories, Inc. slashed its staff by 1,600 employees, and Apple Computer, Inc. issued pink slips to 1,200 workers (see chart page 11).

In a separate announcement last week, Honeywell, Inc. said its second-quarter earnings will decline sharply from \$80 million, or \$1.70 per share, in the same quarter a year ago. A spokeswoman said the Minneapolis-based mainframe vendor's Information Systems Division sales had fallen substantially below second-quarter 1984 results because of weakness in industrial and computer markets.

Honeywell also said that growth for the year will be flat or slightly above that of 1984, "based on forecasts of an improved economy in the second half of the year." Honeywell earned \$239 million on \$6 billion in revenue last year.

See **SLUMP** page 11

TOP OF THE NEWS

■ **Separated on grounds of incompatibility.** Burroughs and Sperry broke off merger talks after determining that a marriage of the two might create more problems than it would solve. **Page 2.**

■ **Sheepskin of marginal value?** That's the way many DP hiring managers regard certification, despite what the certifying authorities claim. **Page 8.**

■ **DEC will modify its net architecture** to comply with international standards protocols in an effort to ease communications between machines of different brands. **Page 10.**

■ **An insurer reduced its telephone bills as much as 15%** with the installation of a virtual private network. **Page 13.**

■ **Not put to the test.** A survey found most firms hold poor track records regarding in-house software testing procedures. **Page 41.**

NEWS

Burroughs-Sperry merger off

Users voice mixed reaction to demise of negotiations

By Peter Bartolik
CW Staff

NEW YORK — Burroughs Corp. abruptly terminated merger talks with Sperry Corp. early last week, scrapping a plan to maintain two mainframe product lines in a merged company.

Sperry, stressing that Burroughs had made an unsolicited bid, reiterated many of the doubts that had been expressed by users and analysts following the initial joint announcement that negotiations were under way [CW, June 17].

In a prepared statement, Sperry said that "there were serious concerns expressed by many customers who questioned the benefits to them of such an arrangement. Further, there was doubt that these customers could accept the credibility of maintaining separate Burroughs and Sperry product lines over the long term. Sperry management shares those concerns."

Burroughs withdrew its offer Monday morning before the stock markets opened, according to Jeanette P. Lerman, vice-president of corporate communications with Burroughs.

Lerman said terms of a proposed merger had been prepared by financial advisors and were presented to management of both companies. "It was time to decide whether or not to do it; [Burroughs] had to have a decision," she said. Sperry, according to Lerman, "decided [it] couldn't do it." Lerman said negotiations had been ongoing for a two-month period and sped up in the days prior to termination of the talks.

Sperry, however, had a different version of how the talks ended. Spokesman J. Peter Hynes said Sperry management had several concerns and sought more information from Burroughs, only to be informed that the offer had been withdrawn.

Although Burroughs said its stock exchange offer would have provided \$65 worth of Burroughs stock for each share of Sperry stock, Hynes said the offer was for not less than one share of Burroughs stock and not more than 1.18 shares for each share of Sperry stock, depending on the price of Burroughs stock.

Lerman said Burroughs had planned on maintaining both companies' mainframe product lines. Despite broad skepticism about that plan, Lerman said the merged company would have enjoyed more than \$1 billion in resources for R&D and engineering, could have reduced expenses by purchasing peripherals common to both and realized savings by eliminating duplicated research efforts. Additionally, Burroughs contemplated unifying the product lines of smaller computers. However, Sperry said the move "would have produced more redundant product lines than complementary

ones." Sperry also said the offer did not meet its own directions, focusing more on telecommunications, software and applications, microprocessing and communications connectivity.

The negative reaction in the stock markets to the merger, Lerman asserted, had as much to do with IBM's revised financial situation [CW, June 17] as the actual terms of the merger. "It would have been interesting to see what happened if IBM didn't make that announcement," she said.

Burroughs has no current plans for similar negotiations with other companies but would consider any alliance that makes sense, Lerman said.

Despite the fact the Burroughs offer was the second this year — in March, negotiations with ITT were also terminated — Sperry said its Information Systems Group "will continue its successful program for growth through internal expansion and partnering in areas of strategic interest."

Although Sperry's statements seemed designed to assure its customer base that the company is well positioned for the future, two users contacted by *Computerworld* said they were disappointed the deal fell through.

"I was hoping they would merge," said Dan Snyder, vice-president of information systems at Tyson Foods in Springdale, Ariz., which a month ago replaced an 1100/80 with an 1100/91. He said Burroughs has outstanding operating systems, while Sperry's operating system is outdated.

The merger would have provided greater competition to IBM, according to Lt. Col. Robert Shingpaugh, director of systems control at Gunter Air Force Base in Alabama, where a diversified hardware base includes four Sperry 1100/62 machines, two Sperry 1050-11s, a Burroughs B4800 and two B4700s. In addition to the competitive aspects, he said, the merger would have ensured greater job opportunities for MIS employees lacking a background in IBM systems.

One Sperry user was not unhappy, however. "I didn't see what the benefit of a merger would be, so it didn't disappoint me," said James Patterson, manager of systems and programming at Northwest Airlines in St. Paul, Minn., where 11 Sperry machines are in operation.

Burroughs users were generally skeptical about the two companies merging. "I would tend to think that an executive in a merged company would be tempted to effect a savings by combining the two service organizations," said Patrick L. Schiavo, vice-president of systems and data processing with Seamen's Bank for Savings in New York. "That's something you can't do overnight."

John J. Monaghan, executive vice-president and chief of administrative services with the Dime Savings Bank, Valley Stream, N.Y., said the merger talks had sparked concern. "I could not see it giving the customer base any additional capabilities."

CW staff members Donna Raimondi and Charles Babcock contributed to this report.

Random access

Starting this fall, any IBM machine running IX/370, Big Blue's answer to Unix, will be able to communicate through Ethernet with IBM-style micros and assorted superminicomputers, including Digital Equipment Corp. VAXs, AT&T 3B2s and Perkin-Elmer Corp. 3230s. The software that will make this local networking capability possible is named WIN/IX and comes from the Wollongong Group, Inc., a Palo Alto, Calif.-based supplier of Unix-oriented software products. Under an agreement announced jointly last week with IBM, Wollongong will begin shipping WIN/IX this autumn when mainframe users are expected to take first deliveries of IX/370, according to the California firm's president, Noel Kile.

The supercomputer being built by ETA Systems, Inc., a 1983 spin-off of Control Data Corp., is developing ahead of its 1987 launch date, according to William Norris, founder, chairman of the board and chief executive officer of CDC. In a recent interview, Norris said the computer is "making excellent progress," and the system, billed as the most powerful supercomputer in the world, may debut ahead of schedule.

The National Aeronautics and Space Administration has taken its first step toward developing an expert system to handle weather forecasting chores for the space shuttle launches and landings. According to a government source, Nasa recently awarded a \$99,643 contract to Cambridge, Mass.-based Arthur O. Little, Inc. for a six-month study on the feasibility of developing a prototype at Kennedy Space Center in Florida.

The list of lawsuit targets of Fort Lauderdale, Fla., communications inventor Rob Elkins will not end with the IBM/Rolm Corp., Rolm Corp. of Florida and Wang Laboratories, Inc. suits, his attorneys said. Companies that may be slapped with Elk Industries, Inc. patent infringement suits in U.S. District Court in Miami include more top names in the telecommunications industry. A source close to the case said most major firms that sell analog-to-digital voice conversion products may get served with papers, including ITT, AT&T, Ericsson Information Systems, Northern Telecom, Inc., GTE Corp. and Sperry Corp. Elkins, who claims to be "the father of digital sound reproduction," has filed patent infringement notices — which are not public record — against several dozen companies since the mid-1970s.

Encore Computer Corp. may be having problems obtaining enough microprocessors to build its planned Multimax mid-range CPU. Encore had said the system, which is based on multiple National Semiconductor Corp. 32032 microprocessors, would be formally introduced at the National Computer Conference. Last week, however, a spokesman said the company would be displaying but not formally announcing the system at NCC. The reason, he said, is that Encore may not be able to set the price and delivery dates in time for the conference.

AT&T is expected to unveil the long-discussed 3B2 400 supermicro. The 400, the bigger brother of the 3B2 300, has an AT&T WE32000 32-bit chip tuned to operate at a higher speed that enables the processor to support up to 20 active users simultaneously. New for the low-end 3B2 is an expansion module that supports a tape drive and additional disk storage. AT&T is also expected to announce the 3B15, a mini that falls between its 3B5 mini and 3B20 supermini.

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WHO DUNIT

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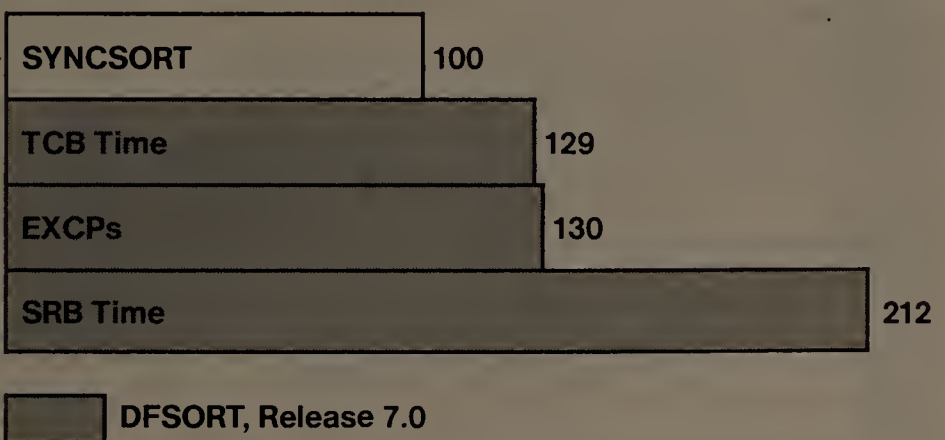
In an extraordinary move, Sortland Yard today warned data processors throughout the world to be on guard against what it termed “gentleman-bandit sort programs.”

The warning was issued by one of the Yard’s best known figures, Inspector SyncSort, who has sometimes been called “a legend in his own CPU time.”

The inspector said, “One of the difficulties in apprehending these chaps is that they look so eminently respectable. They’re members of a fine old hardware family. They’ve been to the right schools. And they invariably carry out their burglaries while wearing a dinner jacket from Saville Row.”

EXPERT COMPUTER CRACKERS. “But once the party is underway,” the inspector said, “these chaps head straight for the place where the family jewels are kept. They can crack open a computer and make off with a king’s ransom in computer resources before you can say ‘Hound of the Baskervilles.’”

To indicate “the true cost of this sort of misbehavior,” the inspector released the following crime statistics:



SOMETIMES TAKE HOSTAGES. The inspector noted that these black-sheep programs often “take a dreadful toll” of programmers. “They are often tied up for days on end and forced to perform unnecessary coding, compiling and debugging. And they are heartlessly deprived of the labor-saving features that are taken for granted in most parts of the civilized sorting world.”

Among these the inspector listed:

- SORTWRITER
- MULTIPLE OUTPUT
- RECORD EDITING
- FAST FILE COPY
- MAXSORT

TELEPHONE BEST DEFENSE. The inspector urged data processors to call the Yard immediately if they suspect their center is infested by a Raffles-type sort program. “The number is (201) 568-9700. We’ll send over one of our highly trained sort detectives to track the culprit down.”

Questioned as to what would be done with sort programs caught burglarizing computer centers, the inspector replied. “They will be given a just and speedy trial. If found guilty, they will immediately be transported to Iran!”

NEWS

IBM software primes System/38 for Office Systems net

By John Gallant
CW Staff

RYE BROOK, N.Y. — Amid a deluge of product introductions and enhancements, IBM last week announced software that transforms the System/38 into a key component of its Office Systems network.

The products, which appear to fulfill Big Blue's earlier strategic commitments to the System/38, include a link between the mini and IBM Personal Computers; operating system enhancements that provide support for mainframe terminals and important IBM communications architectures; and software enabling System/38 workstations to communicate with other IBM office products.

As a result, the System/38 gains the ability to share information with Personal Computers running Displaywrite and to exchange documents with other System/38s, System/36s, mainframes running the Distributed Office Support System (Disoss) and other office systems via IBM's Systems Network Architecture (SNA) protocol LU6.2, dubbed Advanced Program-to-Program Communication [CW, May 27].

William Petrone, founder of Northeast System/38 Users, Inc., said the announcements marked "a coming of age for the System/38."

"The System/38 is no longer just an intermediate processor," said Petrone, who is also director of technical services for Computer Software and Services, Inc. in Sterling, Mass. "The System/38 can now act as a host in an SNA environment. IBM

has made a commitment to the integration of its office products, and the System/38 is the answer. This adds a lot of life to the processor."

The following were among the announcements:

■ **Office/38 Personal Services/38 (PS/38).** This, along with enhancements to the System/38 CPF, allows System/38 workstation users to participate in document exchange within IBM office networks. PS/38 offers capabilities for electronic mail through IBM's Document Content Architecture (DCA), document file, search and retrieval, messaging across one system or a network, text processing and other office functions.

■ **CPF Release 7.0 Office Host Services Support.** This consists of enhancements to the System/38 CPF operating system. The added CPF components provide for SNA Distribution Services (Snads) document exchange with the System/36, System/38, Disoss/370 and 5520 administration system via LU6.2.

The enhancements also support IBM Document Interchange Architecture (DIA) document distribution and library services with the IBM Displaywriter via LU6.2.

Offer interfaces

IBM said the DIA and Snads components of CPF and PS/38 offer function and user interfaces similar to those provided by other IBM office systems that support DIA, Snads and Personal Services. Another communications enhancement to CPF Release 7.0 — dubbed the Distributed Host Command

Facility — allows a System/38 to appear as a host for terminals attached to a 370 architecture mainframe with IBM's Host Command Facility. The terminals will appear to the System/38 as remotely attached 3277, 3278 and 3279 displays. Attachment between mainframes and the System/38 is via SNA/Synchronous Data Link Control.

■ **IBM Personal Computer Support/38.** This provides for information exchange and resource sharing between the IBM Personal Computer and the System/38. The product consists of both a System/38 and a Personal Computer component.

In conjunction with the System/38 software announcements, IBM also unveiled an enhanced version of its 8100 Information System operating system that also provides workstation support of Snads. Release 3 of the Distributed Processing Programming Executive/System Product (DPPX/SP) allows for the distribution of documents, microcomputer files and DPPX data sets through Snads.

PS/38 and Personal Computer Support/38 are scheduled for November availability, CPF Release 7.0 for September and DPPX/SP Release 3 for January. PS/38 has a monthly charge of \$400 or a one-time charge of \$8,000; CPF Release 7.0 has a monthly charge of \$869 or a one-time charge of \$22,000; Personal Computer Support/38 has a one-time charge of \$995; DPPX/SP Release 3 has a monthly charge of \$869 or a one-time charge of \$19,600.

IBM Information Systems Group is located at 900 King Street, Rye Brook, N.Y. 10573.

Addition to System/38 family boasts multichip logic

By Tom Henkel
CW Staff

RYE BROOK, N.Y. — IBM last week replaced its System/38 Model 8 CPU with a newer technology Model 18, said to incorporate more bipolar chips than the Model 8 and to feature a higher density multichip logic module.

The company also slashed prices of other models in the line and of some related peripherals (see story

page 6), while taking steps to make the line more compatible with both larger and smaller IBM processors (see story above).

The Model 18 reportedly offers about 1.1 times the internal performance of the Model 8, and users of smaller System/38 CPUs can field-upgrade to the newly announced unit, presumably through a board swapping process that IBM said takes roughly nine hours.

Available in July, the Model 18 comes in 4M-, 6M- and 8M-byte main memory configurations. The CPU features a minimum instruction cycle time of 133 nsec. An entry-level Model 18 with 4M bytes of main memory and one disk drive costs \$120,000. A similar configuration with 6M bytes of main memory costs \$135,000, and an 8M-byte configuration costs \$150,000.

Announcement highlights

Other highlights of the System/38 announcement include the following:

■ **Expansion of the maximum main memory capacity on the System/38 Model 6 from 4M bytes to 6M bytes.**

■ **The ability to attach twice as many (up to eight) workstation controllers to System/38 models with a workstation Controller-Extended feature. The availability of addition-**

al controllers means that up to 256 terminals can be locally attached to a System/38. The Workstation Controller-Extended feature code costs \$6,200. It can be leased for \$251 per month, and there is a \$29 monthly maintenance charge.

■ **A System/38 X.25 Communications Attachment, an expansion of the previously available X.25 support that provides an interface for attachment to X.25 packet-switched networks through an X.21 interface at up to 19.2K bit/sec. The feature enables communication through an X.25 network to Systems Network Architecture devices attached to a System/38. It costs \$5,000 or can be leased for \$197 per month. There is a monthly maintenance charge of \$50.**

More information is available from local IBM sales offices. IBM's Information Systems Group is located at 900 King St., Rye Brook, N.Y. 10573.

CORRECTIONS

IBM's 3081 Model KX is composed of two tightly coupled processors and is not a single processor, as stated in "User: Quick installation for NAS 8083" [CW, June 17].

In the article "Enhanced Focus release out from Information Builders" [CW, May 13], Intel Corp. was incorrectly listed as the vendor of the Sys-

tem 2000 data base management system. System 2000 is owned by SAS Institute, Inc., which purchased the data management system from Intel in December.

In the June 10 edition, the name of Dataserv, Inc., a Hopkins, Minn.-based leasing and marketer firm, was misspelled.

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NEWS

ANALYSIS from page 1

Certainly IBM is not the first or the fastest to bring departmental computing systems to desktop-size configurations — Digital Equipment Corp. had a much more sophisticated product, the 32-bit Microvax II, out a few weeks earlier — but IBM clearly is the most successful at selling small machines.

The Personal Computer AT brought multiuser microcomputing capabilities to the corporate world, and the desktop System/36 is IBM's first step to adapt the convenience of microcomputers to department mini-computers.

The prodigious list of Personal Computer products that are available today indicates that IBM is committed to ensuring it has a microcomputer targeted at just about every potential customer and that it is just as committed to the microcomputer sale providing an entree to larger systems.

■ As much as it desires a complete array of machines, IBM is also faced with the need to integrate a vast product lineup, ranging from the ubiquitous Personal Computer to the 3090 mainframe.

Software products announced

Buried in the avalanche of announcements made by IBM was a series of software products designed to link IBM processors, including the System/36 and 38 and even the mysterious 8100, to networks.

Document interchange under the Distributed Office Support System will tie the minicomputers together, and Systems Network Architecture will tap the horsepower of the mainframes to run the whole show, according to IBM.

But with each product, or rather, with each wave of products, IBM's effort to tie all its hardware offerings into one cohesive system must surely become just that much more complex.

■ IBM in recent years has shown a willingness to purchase components from other vendors, but that does not mean the company will will-

ingly ignore any opportunities for profit.

Disk drive vendors wooed, snubbed

Microcomputer disk drive vendors have been alternately wooed and snubbed by IBM in recent years as the company doled out contracts to provide storage for its Personal Computer products. With the System/36 desktop version, IBM is offering its own 5¼-in., 40M-byte hard disk drive.

IBM showed another face with the introduction of two Ascii terminals with built-in capabilities allowing them to emulate the terminals of five other vendors, including DEC; historically, other vendors have emulated IBM.

A spokesman for DEC said that his company was flattered by the new products and that the emulation

capabilities available mark a recognition by IBM of the need to coexist in multivendor environments. More likely, IBM saw a need that would be filled by other vendors if it did not act.

■ IBM seems convinced it can weather the current industry slump by putting products on the market as quickly as possible. Not only is some of the new hardware available almost immediately, but the company also moved up delivery dates on a broad range of previously announced software for medium- to large-scale systems.

Prices cuts

Accompanying the product announcements was another round of price cuts starting with the System/36 and progressing up through the 3080 series mainframes. These cuts

also seem designed to prompt decision makers to make their decisions now.

■ IBM is showing little sympathy for the MIS executives who are charged with evaluating, ordering and installing corporate information systems. While the product saturation strategy may make sense to IBM executives, it may be confusing the rest of the world.

While MIS departments are being exhorted by IBM to add 3090 mainframes and enticed to add 3080 models, they are under increasing demand to integrate corporate processing strategies. And with traditional minicomputers facing off against a new generation of miniaturized superminicomputers, integrating departmental processing with corporate processing is no mean feat.

What's the story?

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FATS204	TAPE2	281	987654					1607 FT	4 IN	10	PERM DATA CHECK
FATS204	TAPE2	281	987654					1607 FT	8 IN	10	PERM DATA CHECK
FATS204	TAPE2	281	987654					1608 FT	13 IN	10	PERM DATA CHECK
FATS204	TAPE2	281	987654					1608 FT	17 IN	10	PERM DATA CHECK
FATS204	TAPE2	281	987654					1608 FT	21 IN	10	PERM DATA CHECK
FATS204	TAPE2	281	987654					1609 FT	26 IN	10	PERM DATA CHECK
FATS204	TAPE2	281	987654					1609 FT	30 IN	10	PERM DATA CHECK
FATS204	TAPE2	281	987654					1609 FT	34 IN	10	PERM DATA CHECK
FATS204	TAPE2	281	987654					1610 FT	39 IN	10	PERM DATA CHECK
FATS204	TAPE2	281	987654					1610 FT	43 IN	10	PERM DATA CHECK

The length of these bad spots would cause unrecoverable data checks and I/O errors during processing.


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MESSAGE	IO	UCB	LABEL	OPTION	PASS	FILE NO	RECORDS	LOCATION	LENGTH	RETRIES	ACTION
FATS107	TAPE1	280	123456					1 FT		01	LABEL WRITTEN
FATS204	TAPE1	280	123456					1 FT		01	TEMP DATA CHECK
FATS204	TAPE1	280	123456					2 FT		02	TEMP DATA CHECK
FATS204	TAPE1	280	123456					16 FT			TEMP DATA CHECK
FATS204	TAPE1	280	123456					2375 FT	4 IN	10	PERM DATA CHECK
FATS204	TAPE1	280	123456					2375 FT	8 IN	10	PERM DATA CHECK
FATS204	TAPE1	280	123456					2376 FT	13 IN	10	PERM DATA CHECK
FATS301	END OF REPORT							2377 FT			TAPE INDICATE *****

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NEWS

IBM pares purchase, upgrade prices for mainframes

RYE BROOK, N.Y. — In an apparent effort to make its large-scale systems more attractive without scaring users with implications of a fire sale, IBM last week pared 6% off the purchase price of its 3080 series and 4361 series mainframes while knocking 6% to 8% off the 4381's price.

More hefty price cuts were made on IBM's mid-range System/38, with reductions on for some of those processors and related peripherals of up to 20%.

In what was believed to be an early glimpse of a price cut IBM had been holding for the fourth quarter, IBM dropped the purchase and model-to-model upgrade charges for machines purchased after June 18. On-order machines and model conversions installed after June 18 will automatically receive the lower price.

Memory enhancements within the mainframe product lines were not affected by the price cuts.

For example, users can get a discount by migrating from a 3083 CPU complex to a 3081. But users would not get a discount for expanding the main memory on a 3083 from 16M bytes to 24M bytes.

Across-the-board cuts on 3080 series

Both the base and X models of the 3080 series received 6% across-the-board purchase price cuts. For example, a 3081 Model KX3 CPU with 32M bytes of main memory was reduced from \$2,995,000 to \$2,810,000. The price to upgrade the Model KX3 to a 3084 Model QX6 configuration was cut from \$2,535,000 to \$2,330,000.

The prices of the 4361 Model Group 4 and 5 processors were also reduced. A 2M-byte 4361 Model Group 4 was reduced from \$135,000 to \$126,900. A 12M-byte 4361 Model Group 5 was reduced from \$255,000 to \$244,200. All 4361 Model Group upgrades were cut by up to 12%. For example, the price to upgrade a 4M-byte 4361

Model Group 4 CPU to a 4M-byte Model Group 5 configuration was reduced from \$42,335 to \$39,635.

An example of the 4381 price cuts include 4381 Model L01, reduced 8% from \$370,000 to \$340,400. A larger configuration, a 4381 Model M03, was cut from \$825,000 to \$775,000.

The cost of an entry-level System/38 Model 4 processor with 1M byte of main memory and 64.5M bytes of disk storage was cut from \$49,140 to \$39,140; a 2M-byte System/38 Model 6 with 64M bytes of disk storage was reduced in price from \$80,000 to \$65,000. The cost of a larger System/38 Model 20 with 4M bytes of main memory and 64.5M bytes of disk storage was cut from \$160,000 to \$145,000, and a top-of-the-line System/38 Model 40 with 8M bytes of main memory and 64.5M bytes of disk storage was cut in price from \$220,000 to \$205,000.

— Tom H. [unclear]

IBM 3270 AT touts twice its predecessor's performance

NEW YORK — Last week's wave of IBM product introductions also included the 3270 Personal Computer AT, said to offer more than twice the average performance of the 3270 Personal Computer.

Available in August, the 3270 Per-

sonal Computer AT provides concurrent operation of up to four host interactive sessions, two notepad sessions and multiple PC-DOS 3.1 sessions, IBM said.

Price of the basic system unit, with 512K bytes of random-access

memory (RAM) and a 1.2M-byte diskette drive, is \$6,090. A high-end system unit with 640K bytes of RAM, a 20M-byte hard disk drive and an Extended Graphics Adapter (providing all-points-addressable graphics capability) costs \$8,145. The 3270 Personal Computer Control Program Version 2.1 costs \$300.

Two graphics models also debuted, the 3270 Personal Computer AT/G and 3270 Personal Computer AT/GX, both designed to access data from IBM 370-based host computers to create and display charts, diagrams, drawings and text. The memory addressing capabilities of the AT/G and AT/GX can be extended to 2.5M bytes, IBM said. Both will be available in August.

The AT/G reportedly features a 14-in., eight-color display with 720 by 512 user-addressable points. A basic configuration will cost \$11,670.

The AT/GX is offered with either a 16-color or monochrome display, each providing 960 by 1,000 user-addressable points, IBM said. Price for a starting configuration with 19-in. color display is \$18,920.

The systems will run under the 3270 Personal Computer Graphics Control Program Versions 2 and 3, with Version 3 supporting extended memory capabilities. Version 2, available in August, costs \$450. Version 3, out in September, costs \$550.

More information is available from IBM Information Systems Group, 900 King Street, Rye Brook, N.Y. 10573.

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IBM graphics unit debuts

RYE BROOK, N.Y. — A color graphics terminal for IBM mainframes and two Ascii terminals that can emulate other vendors' products were among the peripheral products unveiled by IBM last week.

The 3179 Color Graphics Display Station is available in two models, the G1 and G2. The Model G1 has a 122-key typewriter keyboard, and the Model G2 has a combination 122-key typewriter and APL2 keyboard.

The units both feature an eight-color, 1,920-char. or 2,560-char. alphanumeric display on a 14-in., all-points-addressable screen.

At the same time, IBM unveiled a 3979 Expansion Unit that provides auxiliary device ports to attach an IBM 5277 mouse and an IBM 7371 or 7372 color plotter. The 3179 Model G1 and G2 cost \$2,995. The Expansion Feature costs \$295. All three are available immediately.

IBM also introduced the 3161 and 3163 Ascii display stations Models 11 and 12 to replace the older 3101 Model 881 terminal, which IBM said it will stop marketing in September.

The newly announced units were designed to be attached to IBM or non-IBM systems. The entry-level 3161 offers basic features such as

menu setup, definable function keys and split screen. It also has an auxiliary port and a cartridge capability for the addition of emulation modules. The unit also includes an Ascii keyboard with numeric pad.

The 3163 includes the same features as the 3161 but adds smooth scrolling, windowing, double-height and double-width characters and a redefinable keyboard, IBM said.

Both terminals can emulate the 3101 Model 881, as well as terminals manufactured by other vendors. The 3161 can emulate Applied Digital Systems, Inc. Viewpoint terminals, Hazeltine Corp. 1500 terminals, Lear Siegler, Inc. ADM-3A and ADM-5 terminals and Televideo Systems, Inc. 910 series terminals. The 3163 can emulate Digital Equipment Corp.'s VT52 and VT100 terminals via a plug-in cartridge emulation package.

Available immediately, the 3161 Model 11 costs \$695, and the Model 12 costs \$774. The 3163 Model 11 costs \$1,095, and the Model 12 costs \$1,174. The plug-in cartridge, which allows the 3163 to emulate DEC's VT52 and VT100, costs \$50.

IBM's Information Systems Group is located at 900 King St., Rye Brook, N.Y. 10573.



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NEWS

Hiring execs don't see ICCP certification as critical asset

Experience, education more important for choice

By Donna Raimondi
and Clinton Wilder
CW Staff

Do DP managers consider the certification of data processing professionals a significant factor in making hiring decisions? Not according to most hiring managers in several companies contacted by *Computerworld*.

The 12-year-old Institute for Certification of Computer Professionals (ICCP) claims that voluntary certification is a valid and useful way for employers to recognize expertise and professional attitude among computer professionals. However, the majority of managers said that certification does not even show up on the list of winning attributes.

Member organizations represented on the ICCP's board include the Data Processing Management Association, the Association for Computing Machinery, the Computer Society of the Institute of Electrical and Electronics Engineers, Inc. and the Association for Systems Management.

"We are more interested in a person's reputation than in his credentials," said Jerry Downer, director of systems development at Best Western International, Inc.'s corporate headquarters in Phoenix. Best Western, an IBM shop, has one staff member with an ICCP Certificate in Data Processing (CDP), but the certificate held no weight in the decision to hire that person, he said.

That opinion was echoed by Mike Accurso, director of systems at National Car Rental Systems, Inc. in Minneapolis. Experience and education are the factors he considers when hiring for his appli-

cation systems programmer slots, which range from entry- to management-level, he said.

Accurso noted that some certification programs allow people who have been in a field for five years to obtain credentials, but "when you look at the field, length [of employment] does not indicate competence," he said.

"I'm always impressed when I see an [ICCP] certificate because I see so few of them," said Charles Connoy, manager of systems at GTE Data Service Co. in Marina Del Rey, Calif. Connoy's shop has an

”

'We are more interested in a person's reputation than in his credentials.'

— Jerry Downer
Best Western International, Inc.

IBM 3084 and a National Advanced Systems Corp. 9070. There is no way to seek out certificate holders because they are so rare, Connoy said. When he does see one listed on a resume, he automatically selects that person to be interviewed, he said.

However, education comes first, experience second and a certificate third on his priority list for hiring, he noted.

A company-developed test of specific skills at Consolidated Cigar Corp. in Secaucus, N.J., makes ICCP certification unnecessary, said George Rey, director of systems and data processing. The test, which includes basic Cobol questions, a logic test for approaches to programming and some testing of math and verbal abilities, effectively screens out unqualified applicants, he said.

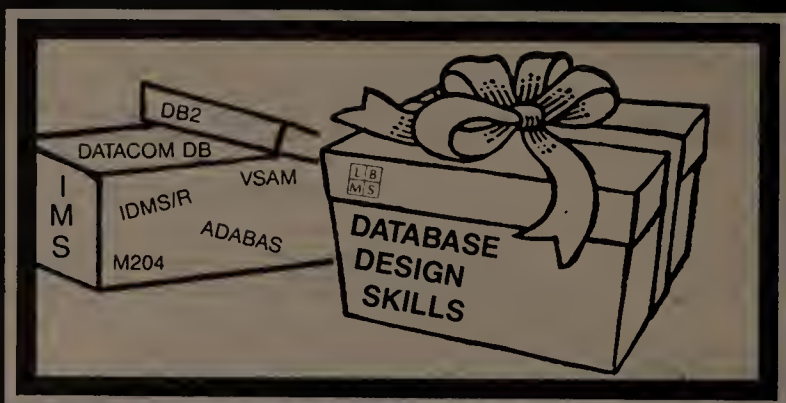
If nothing else, certification shows the applicant's career initiative, said Bobby Webb, director of MIS administration, planning and research at Hardee's Food Systems in Rocky Mount, N.C. "If I had two exactly equal candidates, and one had a CDP, I'd lean toward that candidate . . . but the situation has never come up," he said. Less than 10% of the resumes Webb sees include ICCP certification.

"I think it measures motivation more than talent," said Robert J. Woodrow, director of MIS at Agway, Inc. in Syracuse, N.Y. "I don't think we are in a position yet where testing reveals performance. . . . You can test for technical skills [but] not [for] performance."

For Rich Mathy, assistant manager of data processing at Manitowoc Co., in Manitowoc, Wis., education is the most important criterion when hiring entry-level people. Experience is the chief factor for higher level jobs, and certification does not hit the list at all, he said.

A certificate would demonstrate that a prospective employee's quest is to be more professional in his area, and it would earmark a resume for special attention, according to the manager of a 50-member DP applications department staff in a large research and development contracting firm in New Mexico. The company hires only master's degree-level analyst/programmers, the manager said, and as far as he knows, nobody on his staff has a certificate. He did not foresee a time when certification would be a necessary qualification in his organization.

"For this company, they should save their money [spent for certification]," said Bob Kist, vice-president and manager of systems and programming at Pittsburgh National Bank. The most important qualification is specific experience with banking applications or IBM systems, he said.



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CW685

Insurance firm sets bonus for certificate completion

SOUTH BARRINGTON, Ill. — In contrast to its lukewarm reception in most data processing shops (see related story above), certification of computer programmers is a big deal at Allstate Insurance Co.'s Commercial Insurance Division here.

The systems division strongly encourages its employees to take the Institute for Certification of Computer Professionals (ICCP) exams and gives them attractive incentives to do so. The company absorbs the entire cost for its employees to participate in 22 two-hour review classes, use review materials and take the tests. On top of that, employees who pass an ICCP exam receive a \$500 after-tax bonus.

"The general development of our employees is definitely in our interest," said Senior Project Manager Michael Fitzpatrick, who serves as review session coordinator. "Allstate has a very good program for its insurance employees to advance by insurance career designations such as the CLU [Chartered Life Underwriter]. For the systems group, it's the CDP [Certificate in Data Processing]."

More than 400 Allstate systems employees have earned CDP certificates in the 11 years the firm has had its incentive program, said Fitzpatrick, who sits on the board of ICCP in nearby Des Plaines, Ill. "I got mine in 1975, and I've always

been very interested in certification, so it was a personal goal of mine to advance to a position where I could make decisions about the program," he said.

Fitzpatrick agrees with many DP managers that a CDP certificate does not reflect a worker's skill with a specific application or system, but said it is a positive feature of the program.

"The tests are purposely very broad in nature," he said. "That means individuals are exposed to and refreshed on skill areas that they wouldn't normally touch in their current jobs."

An ICCP certificate may help Allstate employees get ahead within the company, but ironically, it does not mean a great deal at the hiring level. DP hiring at Allstate is handled by the firm's employment division, where certification is little more than an "added plus."

"Whether a candidate is certified or not makes no difference to us," said Thomas Kent, a recruiter for the systems group. "It's not one of the things we look at. It would be an added plus, but our primary concern is whether the person graduated from a good program at a good school or was employed at a good company." Kent, however, does encourage systems employees to become certified after Allstate hires them.

— Clinton Wilder

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NEWS

DEC moves to support international standard protocols

By John Dix
CW Staff

MAYNARD, Mass. — Digital Equipment Corp. said last week that it will modify its network architecture during the next three years to comply with international standard protocols, a commitment that the company said is aimed at facilitating communications between different makes of computers.

In a sweeping announcement, DEC said it will do the following:

- Adopt the approved levels of the International Standards Organization's Open Systems Interconnect (OSI) network reference model.

- Build a software product implementing the OSI's transport level.

- Support the CCITT X.400 messaging recommendations.

- Modify its current X.25 support to conform to the revised CCITT standard.

- Provide hardware and software support of General Motors Corp.'s Manufacturing Automation Protocol (MAP).

Users contacted for comment on the DEC announcement said they were interested and pleased with the commitment but that the real importance of OSI support will only be realized if other vendors follow DEC's lead.

Of perhaps the most significance is DEC's intention to use the four lower layers of the seven-layer OSI network reference model in its Digital Network Architecture, industry analysts said. Computer systems of various makes that comply with OSI-specified protocols will be able to communicate, or so is the intent.

"OSI is going to provide users with a great deal of vendor flexibility by enabling information systems from various manufacturers to communicate. Users won't be tied into one manufacturer's implementation," said Harold Foltz, executive director of Omnicom, Inc., a consulting services company in Vienna, Va., that works with computer vendors to help apply these standards. "This is a key milestone in the evolution of OSI."

DEC will, during the next three years, adopt OSI layers one through four, the only OSI layers that have been ratified as international standards, the highest level of specification, according to John Adams, manager of strategic planning and marketing for DEC's Distributed Systems group.

Level 4 of the model, the so-called transport layer, provides for virtual circuits between computers and ensures that data arrives correctly and in the order sent, Adams explained. "It is the foundation for other network capabilities."

Even though OSI layers one through four are

OSI," noted John Heafner, chief of systems network architecture with the National Bureau of Standards in Gaithersburg, Md. "Large organizations have a need to buy from multiple vendors, and in order to put multivendor products together, they have to have some kind of industry-supported standard."

Some analysts, however, fault OSI because of its options. "While OSI appears to be a standard, it is implemented slightly differently by almost everybody," said John King of James Martin Associates, a consultancy in Carmel, Calif. "OSI really isn't a standard; it is, as they call it, a reference model."

The first product that DEC will build to OSI will be the VMS OSI Transport Service. This product will reportedly facilitate task-to-task communications between a program running under VAX/VMS and a program running on another vendor's system that implements the OSI model. The product is scheduled to be released in early 1986.

Other standards DEC has committed to include the latest release of the CCITT's X.25 and X.400 recommendations. DEC will modify its current X.25 network support to comply with the newly revised 1984 X.25 standard, the company reported. The latest revision specifies use of a symmetrical protocol that enables data terminal devices to communicate without going through a public data network, Adams explained.

DEC said that, in 1986, it would begin to incorporate the X.400 mail and messaging recommendations into its products. This standard reportedly specifies how OSI-compliant networks exchange electronic messages.

Finally, DEC also committed to developing and delivering hardware and software systems that comply to Version 2.1 of GM's MAP. In 1986 DEC will deliver software for VAX/VMS and Microvax/MicroVMS, the company said. Controllers and modems that implement MAP protocols will also be made available at that time.

DEC is headquartered in Maynard, Mass. 01754.

'OSI is going to provide a great deal of vendor flexibility by enabling information systems from various manufacturers to communicate.'

— Harold Foltz
Omnicom, Inc.

now international standards, OSI is still a reference model and, as such, offers a menu of class options. Vendors that implement different OSI classes will not be able to communicate, Adams said.

For this reason, DEC will try to build a superset transport that incorporates components specified by user-driven standards, specifically GM's MAP and Boeing Computer Services Co.'s Technical and Office Protocol (TOP). MAP and TOP are modeled after OSI and use a similar transport layer but differ in their specification of layers above and below the fourth layer.

Adams said that for upper levels of the OSI, DEC will replace its protocols where practical and coexist with the standard where needed. "For DEC-to-DEC communications at the applications level, we will probably maintain our own proprietary protocols because it will allow us to support more functions and achieve higher performance than we would if we supported the industry-standard protocol," Adams said.

"DEC's announcement shows the maturity of

BARRAGE from page 1

Available in July, a starting configuration with 256K bytes of internal memory; a 5¼-in., 1.2M-byte floppy disk drive; a 40M-byte hard disk drive; and a link to the directly attached Personal Computer costs \$5,995. The 5364 System Support Program sells for an additional \$995.

The machine received mildly favorable reviews from industry analysts. Several noted the popularity of the two-year-old System/36 family and the thousands of software programs available for the latest arrival but questioned the system's performance characteristics.

"The direction [in which IBM is] heading with the System/36 PC is a very good one," said Gwen Peterson, director of business computer services at Dataquest, Inc. in San Jose, Calif., but she also listed some important system limitations.

Constraints

"There are only three local workstations, and that will be a major constraint," she said. "And there are so many restrictions on how you can use the required [Personal Computer]; in many respects, it ends up just being a very expensive systems console." Additionally, some form of disk backup is desirable, she suggested.

"I have some real concerns with the performance," said George Colony, president of Forrester Research, Inc. in Cambridge, Mass. Compared with new supermicrocomputers such as Digital Equipment Corp.'s Microvax II, the System/36 line "looks like junior varsity, at this time," he maintained.

Among limitations in running microcomputer software on the attached Personal Computer, IBM said its Topview and Business Management series software, Microsoft Corp.'s Multiplan, Borland International's Sidekick and Microstuf, Inc.'s Crosstalk XVI "should not be loaded while the IBM Sys-

tem/36 PC is active." Various problems also arise with other applications, including Lotus Development Corp.'s Symphony, and some PC-DOS 3.1 functions may not be used, IBM said. Additionally, IBM's PC Network is not supported.

The System/36 PC can handle external commu-



The IBM System/36 PC

nications through a single communications line interface for Binary Synchronous Communications (BSC) or Synchronous Data Link Control (SDLC) on the directly attached Personal Computer. A prerequisite is BSC or SDLC hardware and software on the Personal Computer. The communications line reportedly can handle up to 64 remote displays or printers.

Using the previously announced PC Support/36 program, Personal Computer users can share PC-

DOS data stored on 5364 disk drives and can hot-key between Personal Computer and System/36 sessions, IBM said.

A \$325 diskette exchange facility, used with a Personal Computer AT attached to a System/36 Series 5360 or 5362, permits conversion between the 8-in. format used by the larger machines and the System/36 PC's 5¼-in. format.

IBM announced a host of software packaged for the new machine, including RM/Cobol Runtime (\$250); RM/Cobol Compiler and Runtime (\$1,250); Professional Visual Aid Composer (\$1,500); Composition Utility Version 2 (\$4,500); Business Management Accounting System (\$995 per module); and Business Report/Application Development System (\$1,250). Personal Services/36 will be available for the new machine in first-quarter 1986.

A second 40M-byte hard disk drive costs \$2,095. A \$495 add-on card that expands internal memory to 512K bytes is scheduled for first-quarter 1986 delivery.

Minimum system requirements include a System/36-supported printer, the directly attached Personal Computer (with between 256K and 512K bytes of random-access memory) and PC-DOS 3.1.

The System/36 PC will be sold through IBM's National Accounts, National Marketing and National Distribution divisions. Sales channels will include value-added dealers, selected authorized dealers and selected product centers.

The internal memory enhancements for existing System/36s will be offered in first-quarter 1986. Up to three 512K-byte cards (priced at \$2,500 each) can be added to 5360 Model B processors for a total of 1.75M bytes. Up to four 256K-byte cards (costing \$1,250 each) can be installed in the 5362 for a total of 1M byte.

More information is available from IBM Information Systems Group, 900 King St., Rye Brook, N.Y. 10573.

NEWS

SLUMP from page 1

Also last week, Hewlett-Packard Co. said it would shut down all of its domestic operations July 1-3 as a cost-cutting measure. HP had announced last month it would restrict hiring, travel, overtime and contract labor expenditures. Apple, Wang and DG had all announced domestic plant shutdowns similar to HP's before instituting massive layoffs.

Across-the-board layoffs

A spokesman said the DG layoffs, announced June 17, will affect employees at all levels of the company, including 150 in sales and marketing support positions. Dismissals include 450 workers at three Massachusetts facilities; a total of 200 in Westbrook, Maine, and Portsmouth, N.H.; and 250 among production workers at three plants in North Carolina, two in California, one in Austin, Texas, and one in Mississauga, Ontario. Layoffs will affect 250 overseas employees.

DG's announcement reflected the suddenness of the industrywide downturn, which began early this year and caught computer executives, analysts and market researchers by surprise. Booming sales of minis and superminis to the scientific and technical user market through direct and OEM channels had produced DG's best quarter ever at the end of 1984, with the company earning \$23 million on a record \$333 million in sales.

"The minicomputer business was going great guns six months ago. Data General hired people to position the company for continued growth and got caught with bloated expenses," said Craig Symons, an analyst with the Gartner Group, Inc. in Stamford, Conn. "I think all the major layoffs represent companies streamlining, paring away the fat. I really don't think they're cutting the meat yet."

DG's orders took an anticipated start-of-year dip in 1985 and continued to decline thereafter. Profits for the quarter ended March 30 dropped 36% to \$9.1 million from \$14.2 million in the same quarter of 1984. DG's deCastro said he held little hope for improvement in the minicomputer market before 1986.

Symons said major cost-cutting announcements are a good indicator of vendor pessimism for the near term. "If they were optimistic that things would get better, they would batten down the hatches and ride through the down cycle," he said. "If they're not optimistic, they take steps like this to downsize their companies."

Bob Randolph, a market research analyst for International Data Corp. in Framingham, Mass. and a former DG consultant, said that recently announced products from Digital Equipment Corp. have cut into DG's sales. "The [DEC] VAX 8600 is a watershed product that is getting high-end supermini people back in the DEC camp," he said. "DG is taking some heat there, and the Microvax II may hurt them in the workstation area, too."

IBM micros
get Plus hard
disk drive

By Kathleen Sullivan
CW West Coast Bureau

MILPITAS, Calif. — Plus Development Corp. today is expected to introduce its first product, Hardcard, a 10M-byte hard disk drive mounted on an IBM Personal Computer plug-in card.

Hardcard contains a hard disk drive system in a card measuring 4 by 13 by 1 in., according to company President Stephen M. Berkley. Designed to fit into an IBM Personal Computer expansion slot, the Hardcard includes a 3½-in. hard disk drive, a controller, drive electronics and file management and installation software.

The Hardcard can be installed in any IBM Personal Computer or Personal Computer XT as well as compatible computers, he said. Its retail price will be \$1,095.

According to Berkley, the 2-lb Hardcard has an average access time of 65 msec. When in operation, it uses 10.9W of power. Its specified mean time between failures (MTBF) is said to be 25,000 hours, a figure that puts the Hardcard's MTBF at twice the industry norm for IBM Personal Computer XT-type devices, Berkely said.

The Hardcard comes with the Hardcard Directory, a file management program that allows users to load and locate applications programs and data files on the hard disk. It was developed by Software Publishing Corp., a Mountain View, Calif.-based software firm known for its PFS series of applications programs.

The Hardcard will be produced in Japan at Matsushita Kotobuki Electronics, Berkley said, and will be ready for shipment in October.

At present, the Hardcard is being tested at several companies in the San Francisco Bay area, Berkley said. At the San Francisco-based Bank of America, the Hardcard was installed in an IBM Personal Computer that handles calls to an internal electronic telephone directory.

"We put the Hardcard in about a month and a half ago and it has worked without missing a step," said George Miller, a vice-president in the bank's advanced research and development division.

However, Miller did have problems when he tried to install the device in one of the original IBM Personal Computers residing in his shop, because the read-only memory (ROM) in these early systems was not designed to recognize the existence of a hard disk. As a short-term solution, Miller installed a software program that tells the machine to talk to the Hardcard; in the long run he plans to install an updated Bios ROM, he said.

Hank Chesbrough, Plus Development's product manager for Hardcard, confirmed that users would have to update their systems with the Bios ROM if they own the early versions of the IBM Personal Computer.

More information is available from Plus Development, 1778 McCarthy Blvd., Milpitas, Calif. 95035.

A year of discontent

1985

June
National Semiconductor Corp.
Plans to lay off 1,300 workers.
Wang Laboratories, Inc.
Lays off 1,600 workers.
Data General Corp.
Lays off 1,300 workers.
Storage Technology Corp. (STC)
Lays off 500 workers, resumes five-day workweek.
Advanced Micro Devices, Inc.
Plans four-day workweek, executive pay cuts.
General Electric Information Systems Co.
Lays off 300 workers.
Apple Computer, Inc.
Consolidates manufacturing, lays off 1,200 workers, closes three plants.
AT&T Information Systems
Plans to cut 1,600 positions.
Burroughs Corp.
Plans to transfer or dismiss 750 workers.
Sperry Corp.
Lays off 285 workers.

May
Columbia Data Corp.
Files Chapter 11 reorganization petition.
Ztel Corp.
Files Chapter 11 recapitalization petition.
Hewlett-Packard Co.
Plans extended summer holiday shutdown.
Apple
Lays off 80 workers, closes one plant.
Convergent Technologies, Inc.
Plans one-week summer shutdown at one division.

April
STC
Adopts four-day workweek.
DG
Announces extended summer holiday shutdown.
Texas Instruments, Inc.
Lays off 1,000 workers.
Computervision Corp.
Lays off 950 workers.
Honeywell, Inc.
Small Computer and Office Systems Group lays off 130, plans four one-week shutdowns.

March
Signetics Corp.
Lays off 650 workers.
Control Data Corp.
Announces plans to cut unspecified number of workers.
Intecom, Inc.
Lays off 200 workers.
Apple
Plans staggered one-week shutdowns.
Wang
Plans two-week summer shutdown.

February
Intel Corp.
Lays off 900 workers, closes or reduces operations at several plants.
National Semiconductor
Plans two-week shutdown; later revises plan and adopts four-day workweeks for 10-week period.

January
Apple
Plans to terminate 1,000 temporary workers.
Exxon Office Systems
Lays off 300 workers, seeks buyer.
Xerox Corp.
Plans to sell or close Shugart Associates, Inc.

1984

December
Honeywell
Lays off 1,000 workers at Synertech division; seeks buyer for division.
TI
Lays off 2,000 workers.
Walker Interactive Products, Inc.
Lays off 100 workers.

November
STC
Lays off 1,200 workers.

October
STC
Files Chapter 11 reorganization petition.

September
Gavilan Computer Corp.
Files Chapter 11 reorganization petition.

August
Amdahl Corp.
Cuts 300 positions.
AT&T Technologies
Plans to cut 11,000 positions.

NEWS

Ten banks form lockbox-based cross-country network

By Charles Babcock
CW New York Bureau

NEW YORK — Manufacturers Hanover Trust Corp. in New York and Wells Fargo Bank N.A. in San Francisco, along with eight other banks, have found that a little technology can stretch a long way.

Using little more than a micro-based program and standard asynchronous communications, they have formed a cross-country network out of their individual lockbox fund collection services.

Lockbox is the practice of a bank collecting receivables for a corporate customer, saving the time the corporation formerly spent transferring payments from itself to its bank. The

collection service has been around since the 1940s and can be viewed "as a mature product," said Georgette Cipolla, a vice-president at Manufacturers Hanover and president of the new network, U.S. Dollar Net (U.S.\$Net).

One day of 'float' eliminated

Accounting firms estimate that lockbox service saves a company at least a day of "float," the period it must wait for customers' checks to clear and funds to be released into its account.

By forming a network, the 10 banks have added several new features to an old service:

■ A corporation can have its cus-

tomers send payments to the network bank nearest them, saving part of the time that a check spends in the mail. A company in New York, for example, could have a customer in San Francisco send its payment to a Wells Fargo lockbox there. Wells Fargo would then effect an electronic transfer to Manufacturers Hanover in New York during the same day, eliminating two or more days delay before the money would be booked to the company's account, according to Cipolla.

■ A corporation that previously set up its own lockboxes in several cities with several banks may be able to achieve the same goal dealing with one bank in the network. "It totally eliminates the geographic nature of

your receivables," Cipolla said.

■ Although a company may have lockboxes at 10 banks on the network, its fees are not increased by the same factor. Cipolla said she could not reveal Manufacturers Hanover's fees without violating anti-trust regulations, but there would be a price break over opening separate lockboxes at each bank, she noted.

Features provide added reach

These features give the lockbox service added reach, and in a competitive banking climate, that could be an advantage, according to banking observers. But the banks achieved the service enhancements with only a modest addition of technology.

"I wish I could tell you we use a [Cray Research, Inc.] mainframe, but we don't," said John J. Cipriano, vice-president in charge of product management at Wells Fargo, one of the banks that originated the regional network that served as the model for U.S.\$Net.

When funds are deposited in a lockbox, they are entered into the general accounting system, much as any other deposit, on the bank's mainframes. From that point, the data is accessed, tabulated and moved about by a program written for the IBM Personal Computer, Cipriano said.

Exchanges not dollar for dollar

The banks do not do a dollar-for-dollar exchange in each lockbox transaction. Rather, they net out the difference between what they would send to another bank vs. what they would receive, one of the key functions of the software, Cipriano said.

"We had developed our own treasury workstation and used bits and pieces of it" for the U.S.\$Net program, he said.

The treasury workstation is a proprietary program for a personal computer that helps a corporate treasurer interface with several banks, retrieve financial data soon after it appears in an account and put data into a standard Lotus Development Corp. 1-2-3 format, he said.

Standard transmissions used

The U.S.\$Net software uses standard asynchronous data transmissions to effect transfers. "It is a rather simple application, but it has enormous leverage," Cipriano said.

Charles L. Biggs, a partner in charge of banking service at the New York office of Touche Ross & Co., a Big Eight accounting firm, said the lockbox network will probably cut "two, three or four days off the float of a corporate payment, and that's really dynamic. They're taking a little bit of technology and adding value to their product."

The network was incorporated March 5 in California. Cipolla said 24 of Manufacturers Hanover's 400 corporate lockbox customers have requested the service so far.

In addition to Manufacturers Hanover and Wells Fargo, the following banks are involved in the network: Bank of Hawaii, Bank of New England N.A. in Boston, Center Bank in Missouri, First National Bank of Maryland, National City Bank of Cleveland, Rainier Bank of Washington State, United Bank of Denver and Valley National Bank of Arizona.

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NEWS

Virtual private net cuts firm's phone costs by up to 15%



FIRST USER

By Paul Korzeniowski
CW Staff

NEW YORK — Home Insurance Co. here, the first user of Isacomm, Inc.'s Virtual Private Network, reported that the network has cut monthly telephone costs by from 5% to 15% and paid for needed network equipment in three months.

"We chose U.S. Telecom's [Isacomm is a U.S. Telecom company] Virtual Private Network because it would provide us with reliable transmission and cut costs," noted Seth Lewis, telecommunications manager at Home Insurance.

Home Insurance's relationship with U.S. Telecom started before the installation of Virtual Private Network. "We have U.S. Telecom's long-distance service at our home office, so we were interested in its virtual private network when it was first announced," Lewis said.

When Virtual Private Network was announced, the insurance company decided to install it at 15 field offices. While the home office had used U.S. Telecom's long-distance network, the field offices had worked with a number of carriers such as AT&T and MCI Corp. for their long-distance requirements. Home Insurance's Virtual Private Network replaced the various dial-up long-distance services.

Many features provided

A virtual private network provides a number of features. Companies can, for example, create seven-digit corporate dialing plans without having to install a private line to every location supported. The system automatically converts seven-digit numbers to 10-digit numbers when a trunk is full. Speed numbers can reduce dialing to three or four digits. Authorization codes prevent nonem-

National Semi posts loss

SANTA CLARA, Calif. — National Semiconductor Corp. said last week it lost \$2.7 million, or 3 cents per share, in the fourth quarter ended May 31. The loss reflected a 9% drop in revenue from \$470.8 million a year ago to \$428.6 million, evidence of the current downturn in the semiconductor market.

National Semiconductor's loss was cushioned by a \$3.8 million extraordinary credit from an accounting use of foreign operating loss carry-forward charges. In the year-earlier quarter, the company earned \$24.4 million, or 28 cents per share, including an extraordinary credit of \$7.8 million.

The company posted record sales of \$1.79 billion in the fiscal year ended May 31, compared with \$1.65 billion in fiscal year 1984. But profits plummeted 32.5% from \$64 million in the previous year to \$43.2 million in fiscal 1985.

ployees from accessing the system, and account codes supply billing information.

Fifteen Home Insurance offices located throughout the U.S. have been connected to the U.S. Telecom network since it was first cut over three months ago. A Northern Telecom, Inc. SL-1 private branch exchange in each office is connected through dedicated lines, leased by U.S. Telecom from a local operating company, to U.S. Telecom's point of presence in each locale. Major locations include New York; Chicago; Columbus, Ohio; Los Angeles; Denver; St. Louis; Kansas City, Mo.; Phoenix; and Boston. Lewis plans to add three offices to the network during the summer and a number of branches in the fall. The network has resulted in reduced long-distance costs, Lewis said.

He estimated that installing Virtual Private Network cost \$30,000. "We had to purchase some PBX line cards and other small items," he said.

The cost included some needed changes to Home Insurance's telephone network. "Some offices needed additional trunks, so we decided to install them with the new network," Lewis said. Savings from reduced long-distance costs have paid for the equipment, he said.

Normal installation problems

The telecommunications manager reported that Home Insurance experienced normal first-time installation problems. "There were some problems with branch transmissions," he said. "Sometimes, the problem was with the local telephone company, and other times it was with the office line. At one location, U.S. Telecom was unable to transmit a microwave shot. But there weren't any major glitches." The service is primarily used for voice transmission. "There is some dial-up data transmission, but it is minimal," the telecommunications manager noted.

The network has the potential to transmit the company's data as well as voice transmissions. Currently, the company transmits branch data on IBM System/34 or 36 minicomputers over AT&T private lines to Home Insurance's IBM 3084 mainframe.

Lewis listed a number of reasons why the company is not using Virtual Private Network for data transmission. A major factor is that U.S. Telecom does not plan to complete its fiber-optic network until 1988. "I am not sure that some of the present facilities would be able to meet our data transmission speed requirements," he said. "Once the fiber-optic network is in place we may take a closer look at transmitting data on the network. Until that time, we will keep our present network."

Lewis added, "Our data network is dispersed through the U.S. and Canada. [Virtual Private Network] is not available in all these locations at this time."

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NEWS

Novell unwraps IBM AT-based fault-tolerant local net



CW AT
PC EXPO

By Eric Bender
CW Staff

NEW YORK — Novell, Inc. unveiled personal computer local-area networks built around off-the-shelf hardware and offering three levels of fault-tolerant operation at PC Expo here last week.

Supported under Novell's Advanced Netware/286 network software, "basic fault-tolerant systems can be put together for under \$30,000," President Ray Noorda claimed. He pointed to potential use in financial, manufacturing and other applications in which avoiding system downtime is essential.

The Novell offerings are not the first to provide fault tolerance on microcomputer local-area networks, but they are the first to be configured around industry-standard hardware, according to Novell Marketing Vice-President Craig Burton. Nestar Systems, Inc. of Palo Alto, Calif. began shipping fault-tolerant products a year ago.

The Advanced Netware/286 fault-tolerant file server is a dedicated system based on an IBM Personal Computer AT and supporting up to 15M bytes of internal memory, 2G bytes

of disk storage, 128 users and five shared printers, Burton said.

To off-load some of the disk I/O processing, the server can accept up to two Netware Disk Coprocessors, which are based on an Intel Corp. 80188 microprocessor and feature 16K bytes of random-access memory and the SCSI interface.

The system design addresses potential failures in the server's disk storage, the server itself and in the network's communications hardware, Burton said.

First-level features

Available in the third quarter, the first level of fault tolerance includes duplicate directory and file allocation

maintenance, read-after-write verification and media-defect detection and correction. The software costs \$2,495 per server, and the Disk Coprocessor will sell for \$895.

Level two, scheduled for fourth-quarter delivery, adds disk mirroring, with storage automatically duplicated on a second disk. Using dual Netware Disk Coprocessors, the network also will provide disk and controller duplexing. Additionally, the dual coprocessors will speed performance during network reads of the disk, Burton said. Second-level software is priced at \$3,495 per server.

Most Netware customers "that look at data integrity as critical" will migrate to the second level of fault

tolerance, Burton said.

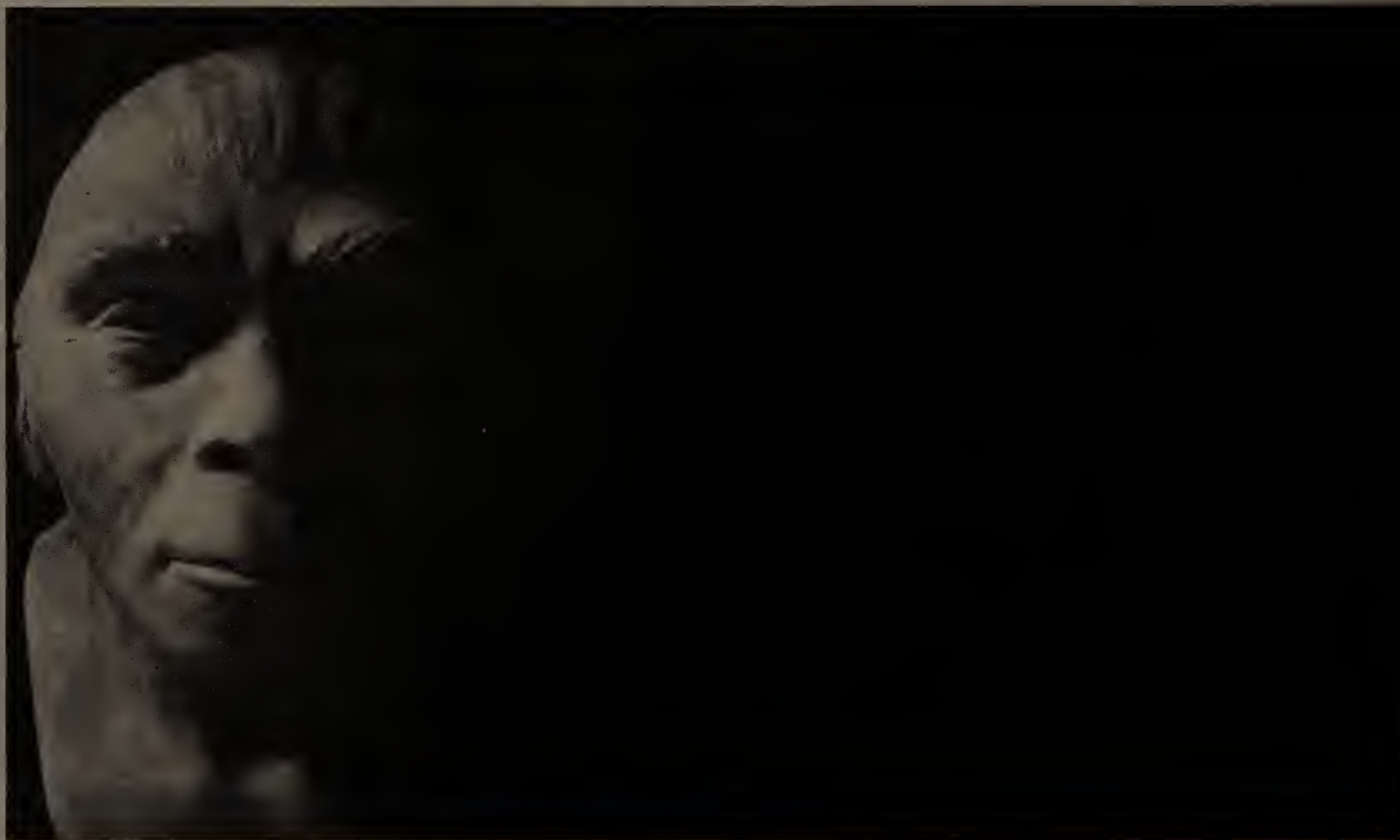
Advanced Netware/286's third level of fault tolerance adds server mirroring and server duplexing, Burton said. The third level will be available in first-quarter 1986 for \$4,995 per server.

While Novell does not plan to offer an uninterruptible power supply (UPS) itself, Burton noted that adding a UPS is a requirement for fault-tolerant operation.

Applications written for other versions of the Netware family of network operating software will run under Advanced Netware/286, Burton said.

Novell is located at 1170 N. Industrial Park Drive, Orem, Utah 84057.

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Most emphatically, Command Center is not another "link" product that awkwardly attempts to communicate between database and decision-maker.

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Ore. House OKs VDT bill

By Maura McEnaney
CW Staff

SALEM, Ore. — VDT legislation came one step closer to law here recently, after the Oregon House of Representatives gave a 31-28 vote approval to a bill requiring statewide education programs for VDT workers. The bill now faces final approval by Oregon Governor Victor Atiyeh.

A spokesman for the governor's office, however, indicated that the governor had voiced objections to an earlier version of the VDT bill, which, the spokesman said, does not appear to be significantly different from the one passed by the House.

The spokesman also said the governor believes potential hazards that could be associated with VDT use are best addressed by existing statutes and do not merit statutory regulations. The bill could reach the governor's desk later this week.

Approved by a 27-1 margin in the state Senate earlier this year, the bill requires the director of the state's Worker's Compensation Department to set up education and consulting programs for workers using VDTs. It also requires the director to develop guidelines for the purchase, installation and use of VDTs for state workers using terminals for four or more hours per day.

The guidelines will be optional for private-sector businesses, according to a spokesman from 9 to 5, the National Association of Working Women, which is lobbying for the VDT legislation.

NEWS

PC/Focus gets single-user upgrade, network version

By Eric Bender
CW Staff

NEW YORK — Information Builders, Inc. has expanded its PC/Focus fourth-generation language/data base management system product with a single-user release, the addition of a network version and a host-language interface.

PC/Focus Release 1.5, now being shipped, provides major improvements in ease of use, data base efficiency and communications, the company claimed.

Among ease-of-use enhancements are a multiwindow text editor and a Hot Screen Report Output facility with full screen report scrolling and the ability to select and save report

data in a file for later use, according to the vendor.

Upgraded DBMS features include an improved screen manager that can use color, reverse video, underscore and other display attributes; compiled Modify procedures; and a Combine feature permitting a set of up to 16 data base files to be relationally joined, the company said.

Added communications features

Added communications features include an enhanced asynchronous protocol that provides continuous error checking and retransmission facilities, support for CXI, Inc.'s Pcox board and support of the Hewlett-Packard Co. 7475 flatbed plotter, the

vendor said.

Release 1.5 upgrade kits are free for customers now under the company's extended maintenance and service contract. For other current users, the product costs \$550. The price for new users is \$1,595. In addition to IBM Personal Computers, the package is available for the Wang Laboratories, Inc. Professional Computer, Texas Instruments, Inc. Professional Computer, HP Touchscreen, NCR Corp. Workstation 300 and Convergent Technologies, Inc. Ngen computers, according to the vendor.

Multiuser PC/Focus, which contains all the features of the single-user Release 1.5, will be offered on the Nestar Systems, Inc. Plan series

networks in August and the IBM PC Network in the fourth quarter.

The software consists of two components — PC/Focus software, which can be loaded onto a network file server or onto a local hard disk drive workstation, and Sync software, which can be stored on the file server or on a Sync machine.

Acts as traffic coordinator

This last device, based on a 512K-byte IBM Personal Computer AT or compatible, is a network resource that acts as traffic coordinator for access to Multiuser PC/Focus data bases, a spokesman for Information Builders said.

Multiuser PC/Focus will cost \$4,800 for an eight-user version and \$6,800 for a 16-user version, with one year of maintenance and enhancements included.

The Host Language Interface enables programs written in traditional programming languages to create, build and maintain PC/Focus data bases. The data bases can be designed as simple relational tables or as more sophisticated hierarchical and networked structures, according to Information Builders.

Available in August, Version 1.0 of the Host Language Interface can be used with IBM's PC Assembler, Microsoft Corp.'s Fortran 77 and Pascal and Computer Innovation's C86 languages. A license for use on up to 20 personal computers costs \$2,500 and includes a year of support, maintenance and enhancements.

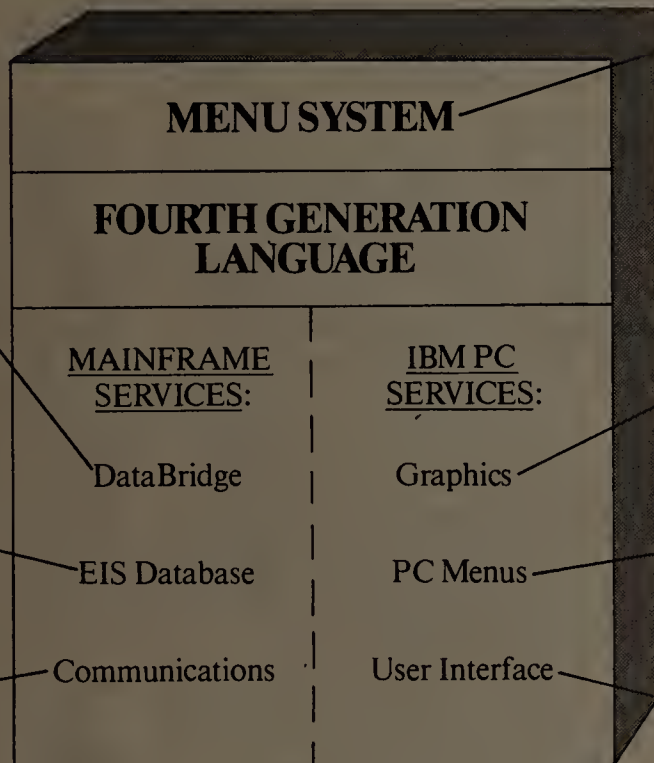
Information Builders is located at 1250 Broadway, New York, N.Y. 10001.

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Menu System: Gives you mouse or touch-screen driven operation, controlled from the host. Provides the user with the ease of use of a PC with the database power of your mainframe.

Graphics: The PC graphics module creates bar, line, scatter, cross-sectional charts, and mixed text and graphics from data and commands sent from the mainframe.

Local Menu Storage: Menu screens can be stored on the PC so they don't have to be re-transmitted from the host.

User Interface: Non-keyboard pointing devices such as a mouse or touch are used for menu selection. Keyboard access is an option.

THE SYSTEM AT WORK:

Because Command Center is a single, 100% integrated micro-mainframe system, it gives MIS a way to serve a wide variety of purposes throughout the managerial structure of a company. For example:

One of the country's largest consumer products companies is using Command Center to build an executive system for presidents of its ten operating companies. Key items tracked include weekly sales, financial data, competitive information and industry news stories.

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August report to target productivity

What do DP and MIS managers need to keep their staffs productive and their software running efficiently?

Computerworld's August Special Report will examine this year's productivity tools and trends. It will focus on tried-and-true maintenance techniques and new technologies that managers are using to keep their organizations operating smoothly.

Contributions should take one of two forms: a tutorial article that discusses an issue or trend, or an application story that outlines a particular user firm's experience with productivity tools.

Articles must be typed, double-spaced and range in length from three to six pages. Artwork, such as charts, graphs and photographs, is encouraged.

Authors should include a brief biography and a telephone number at which they can be reached.

If you have a story or questions concerning the Special Report, contact Janet Fiderio, Special Reports Editor, Computerworld, Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

NEWS

SAS statistical package expands firm's micro offerings



CW AT
PC EXPO

By Maura McEnaney
CW Staff

NEW YORK — SAS Institute, Inc. expanded its line of personal-computer-based products with its recent announcement of SAS/Stat, a statistical package designed to be used with SAS base data management and analysis software running under the IBM PC-DOS operating system.

The company also announced a terminal emulation product that allows users to produce hard-copy graphics with an IBM Personal Computer. The announcements were made last week at PC Expo here.

SAS/Stat, scheduled for release in the fourth quarter, reportedly offers interactive statistical procedures for simple and complex analyses and includes an interactive windowing facility for editing and managing I/O and messages.

The SAS/Stat software can be integrated with the SAS System on mainframes and minis, the vendor said. SAS under PC-DOS, scheduled for release in the third quarter, includes an Irma Decision Support Interface that allows SAS data sets to be uploaded or downloaded from the host computer to the micro.

The annual license fee for SAS/Stat software, which is delivered on IBM Personal Computer XT-formatted master diskettes, varies according to the number of workstations supported — 50 workstations would cost \$2,000.

Also announced was SAS/Rterm, a remote communications product that can emulate Digital

Equipment Corp.'s VT100 terminal as well as the graphics commands of Tektronix, Inc.'s 4695 ink-jet printer, the IBM Personal Computer Graphics Printer and Hewlett-Packard Co.'s 7470, 7475 and 7550 plotters. The SAS/Rterm capabilities can be accessed via the device driver in SAS/Graph Version 5 graphics software.

When a user wants to print a particular graph, the image reportedly is transmitted to the printer, allowing the user to move on to another task while the graph is being printed.

SAS/Rterm connects to the host through Ascii asynchronous support and requires 256K bytes of memory. A color monitor and color/graphics adapter are required for graphics previewing.

A first-year license for the SAS/Rterm software is \$1,500 for 50 workstations.

SAS Institute can be reached through Box 8000, SAS Circle, Cary, N.C. 27511.

How To Triple The Speed Of Your 3270 Printer



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It's a sad sight. Seeing your IBM 3270 printer falling further behind every day. Outpaced by ASCII printers that deliver far greater performance at a much lower cost. ASCII printers that, until now, didn't link to your 3270 system.

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REPORTER'S NOTEBOOK



CW AT
SYNTOPICAN XIII

Ramblings from the floor of Syntopican XIII last week:

■ It would have been easy for Syntopican attendees to take a wrong turn and sit down for a session titled "Ideas on Increasing Production in Conveyor Car Washes." That's because the annual convention of the International Car Wash Association/National Car Wash Council was sharing the Washington Convention Center with Syntopican last week.

■ Are your micro users frustrated by the bureaucratic procedures developed to enhance security and protect data integrity? Kenneth G. Rau, a partner in the Winchester Consulting Group, a consulting firm in Woburn, Mass., recommended the use of an automated data distributor hardware and software program to control data access.

"Standing between the [micro] user and the corporate data base, the automated data distributor, or ADD, acts as interpreter, sentry and translator for the users' data needs," Rau said in a Syntopican paper. ADD provides tailored data files to micro users based on previously submitted user data requirements, he said.

■ The Association of Information Systems Professionals (AISP), the sponsor of Syntopican, will be

making some changes for Syntopican XIV, to be held in San Francisco next year. At a recent summit meeting with leading vendors about the decline in

vendor participation in trade shows, the AISP staff got at least 20 practical suggestions for changes.

In addition, the AISP has formed Information Systems Exhibits, Inc. to manage future Syntopican shows. AISP allowed its contract with Prestige Expositions, Inc. to expire.

Syntopican XIII had only 50 exhibitors, but vendors said they had good traffic at hours when there were no educational sessions.

■ One exhibitor, Lanier Business Products, Inc. of Atlanta, drew a crowd by staging a trivia game show, sprinkled with trivia questions about Lanier products and markets.

■ Telecommunications managers can advance their careers if they demonstrate ways that the telecommunications system can enhance the company's products and services, according to Robert A. Derounian, telecommunications specialist at Eastman Kodak Co. in Rochester, N.Y. "Demonstrate your business acumen before selling technology" to corporate executives, he recommended.

Gun scare at DEC plant all wet

LITTLETON, Mass. — High-tech high jinks brought the local police to a Digital Equipment Corp. small systems engineering plant here one morning last week. Officers from Littleton and nearby Boxboro responded to a report that someone had walked into the plant carrying a concealed weapon; specifically, the report said, a powerful Israeli-made Uzi machine gun wrapped in a towel.

Between 200 and 300 employees were evacuated by fire alarm — a method chosen by police so as not to provoke the would-be gunslinger.

But police found no Middle Eastern terrorist inside blasting DEC Rainbow computers.

Instead, investigation revealed the weapon was actually a sophisticated, state-of-the-art water pistol — unloaded. Apparently, several DEC employees at the plant were similarly armed for battle in an ongoing game — a fact unknown to the DEC employee from another facility who spotted the alleged gunman while waiting in the lobby.

The incident, however, did not damage DEC's reputation for pride in expert engineering. "It turned out to be a \$20, battery-powered water pistol that can shoot 25 feet," a Littleton police officer said. "It's amazing — it looks very real. I've never seen one like it in my life."

In Two Weeks Software International Will Announce A Masterpiece In Mainframe Applications Software.

Here, in these pages, in two short weeks, we will announce a mainframe applications software product so well thought out, so richly functional, so laden with features, so simple to use, it will be simply impossible to ignore.

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NEWS

DEC adds financial application to All-In-One system

MAYNARD, Mass. — Digital Equipment Corp. last week continued the expansion of its All-In-One Office and Information System with the introduction of a financial and operations planning package. The Business Operations and Strategy System (Bossystem) is the second in a series of departmental applications based on All-In-One that also includes the All-In-One System for Sales and Marketing introduced in February [CW, Feb. 11].

According to a DEC spokesman, the All-In-One Bossystem consists of five major components designed to provide corporate and financial data to departmental managers. The components include menus that provide

an interface to overall systems functions, a spreadsheet with communications capabilities for the distribution of data, a data management facility, a report generator for ad hoc and periodic reports and an applications template library. All components can be customized by individual data centers.

The spokesman said the Bossystem gives departmental managers and staff access to data through the product's data base.

Integration options

The product can be integrated with the System for Sales and Marketing package and third-party software packages. It is accessible from

the All-In-One Version 2.0 menu and provides what the spokesman labeled "high-level report access techniques" that allow users to view key departmental data.

The applications templates can be used for developing forecasts, budgets and reports, and the product includes additional facilities for developing project and manufacturing control and investment and long-range planning applications.

Also included with the Bossystem is the capability to send live spread-

sheet and graphics documents among users and a data link that allows users to transfer information to and from spreadsheets and to reports from the departmental data base.

Scheduled for October availability, the All-In-One Bossystem costs \$10,000 for the VAX-11/730, 11/750 and 11/785 systems and \$15,000 for the VAX 8600. Prices range from \$6,000 to \$9,900 per CPU for VAX cluster systems.

DEC is located in Maynard, Mass. 01754.

OA productivity requires more emphasis on training



CW AT
SYNTOPICAN XIII

By Mitch Betts
CW Washington Bureau

WASHINGTON, D.C. — Corporations spend a "paltry" 6% of their office automation budget on staff training, according to Sidney E. Harris, OA expert at Georgia State University. That figure will have to be raised significantly for OA to fulfill its potential for improving office productivity, he told attendees at last week's Syntopican XIII here.

Without adequate training, expensive hardware and software will go unused, Harris said at the Syntopican session titled "Alternatives for End-User Support Strategies." He recommended development of an information center and a user group to provide training and support for end users.

Laura Scharer, manager of information systems planning and management services at O. M. Scott & Sons, Inc., the Marysville, Ohio-based lawn care firm, strongly agreed with Harris' assessment.

"Training can be what wakes up the technology," Scharer said. Teaching end users how to use their OA tools, she explained, helps the organization to obtain the return on investment projected when the OA equipment was first purchased.

To get started on a training program, Scharer suggested that the information center manager conduct a survey of the organization to understand better its state of computer literacy and find out who needs training. She provided several other tips for training programs:

■ Demonstrate that the information system can solve practical busi-

ness problems encountered by the users.

■ Offer demonstrations, which keep the attention of users better than lectures and homework.

■ Develop a "buddy system" among users so that expert users help novices.

■ Provide "cheat sheets" of routine commands as part of the training materials, since users will spontaneously develop them anyway.

■ Be sure to provide training for the trainers.

Harris said his 1984 study of Atlanta businesses showed that end-user support typically goes through seven stages. In the first stage, when there are few microcomputers in the organization, users must learn by doing. In the second and third stages, training classes are begun as more micros come aboard. In the fourth and fifth stages, a micro manager is appointed, an information center is formed and a user group starts. In the sixth and seventh stages, the micro department becomes so advanced that it may even sell its services to other subsidiaries and outsiders.

Harris stressed that effectiveness of the OA implementation must be continuously monitored so the organization can learn from its mistakes.

In another presentation, Theodore Stout, president of the Blake Corp., an Atlanta-based consulting firm, said OA should become an integral part of the company's facilities management program, so that OA managers have a say in the design of the office and purchase of furniture.

Major gains in office productivity are possible, he said, with improvements in furniture, acoustics and office design. In one case history Stout cited, placing acoustic boxes over noisy line printers increased office performance by 8.8% and had an investment payback of three days.

How To Delight Your Lotus With Mainframe Data



Another Smart Solution From AVATAR

The idea is simple. Make your PC spreadsheet even more powerful by giving it mainframe data. But getting that data out of your mainframe, into your PC and onto your spreadsheet isn't that simple.

Until now, you've had three choices. Transfer entire files from the host and risk choking your PC with data. Not very efficient. Or find the information in printed reports, then reenter and reformat it. Very tedious. And the alternative of asking your DP department to write special host software...well, they're overburdened already. Three choices, no real solution.

Now there's TURBO, the newest micro-to-mainframe link from AVATAR.

TURBO's Data Capture lets you select just the information you need from the mainframe. And use it immediately in any of your PC applications — Lotus, dBASE, you name it. Without rekeying, reformatting, re-anything.

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So give your PC a TURBO from AVATAR. And delight your Lotus with mainframe data.



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Chip meet to focus on transition

TUCSON, Ariz. — Representatives of the semiconductor industry will speak at the Semiconductor Industry Conference Oct. 14-16 at the Sheraton El Conquistador Hotel here.

The theme of the conference, sponsored by Dataquest, Inc., will be "An Industry in Transition." Topics to be

discussed include high-level silicon applications and the challenge of automotive electronics.

Registration is \$750 for Dataquest clients and \$1,000 for others.

Information is available from Dataquest, 1290 Ridder Park Drive, San Jose, Calif. 95131.



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computer-based training. Technical support is provided for our main-frame, minicomputer, and microcomputer users, and documentation comes with your system.



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The SAS System runs on IBM 370/3030/4300 and compatible machines under OS, MVS, DOS/VSE, VM, and TCCF; on Digital Equipment Corp. VAX™ R400 and 11/70 series under VMS™; on Prime Computer Inc. Prime 60 series under PRIME™; on Data General Corp. ECLIPSE™ MV series under MVS/VS, on IBM 770/70 and AT/370 under VM/PI; and on IBM PC XT and PC AT under PC DOS. Not all products are available on all operating systems.

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NEWS

Software suit alleges violation of shrink-wrap law

By Edward Warner
CW Staff

TORONTO — Quaid Software, Ltd., the publisher of a program that defeats the copy protection of some personal computer software products, is facing a \$100 million civil suit brought against it earlier this month by Vault Corp., makers of the Prolok copy protection system.

The suit, filed in Federal District Court in Louisiana under that state's 1984 shrink-wrap software protection law, claims that Quaid Software, based here, illegally decompiled and copied Prolok. Quaid decompiled Prolok, the suit alleges, to produce its Copywrite program, which reported-

ly can defeat Prolok protection.

However, Robert McQuaid, Quaid Software's president, claimed Copywrite is used only for making legal backup copies of a protected program. While acknowledging that his firm has "occasionally looked at software with a decompiler," McQuaid maintained that "in the case of Prolok, it was not necessary to do something that sophisticated."

McQuaid added that his firm has done nothing wrong but is, nonetheless, eager to settle the two-week-old suit, saying, "I'm not an advocate of spending a large amount of money on lawyers." McQuaid, however, said his firm will not pay Vault the entire

sum demanded in the suit.

Vault Chairman W. Krag Brotby, meanwhile, said the suit will determine whether Quaid Software can produce software that allows users to make unlimited copies of a copy-protected program "as long as [users] call them backups." Louisiana's shrink-wrap software protection law requires users to abide strictly by the license agreement of a personal computer software package when the agreement is printed on the package's exterior and the package is covered in see-through plastic wrapping. To break open the shrink wrap is to agree to abide by the license, the law states. Vault said Prolok's packaging

meets that law's requirements.

The suit also alleges that "Quaid has willfully and maliciously misappropriated Vault's trade secret, the Prolok software program, and thereby violated the Louisiana Uniform Trade Secrets Act." McQuaid said that he found the claim "incredible" in light of what he said was Vault's having "distributed several million copies of its software."

Approximately half of all personal computer software in use by U.S. businesses is pirated, amounting to a loss of \$600 million to \$800 million annually for software publishers, according to a survey by Dallas-based Future Computing, Inc.



CALL FOR PAPERS

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Southeastern U.S., January 1986

Papers are solicited in the following areas: interactive systems for centers, forecast and warning offices, television stations and research; teleconferencing and local-area, national and international data networks; distribution and dissemination systems including radio, satellite and cable television systems; systems, technologies and applications for developing countries; and other topics.

The deadline for the submission of abstracts is August 1. They should be sent to G. Stanley Doore, Office of the Federal Coordinator, Suite 300, 11426 Rockville Pike, Rockville, Md. 20852. Papers are due by Nov. 1.



MANAGERS ON THE MOVE

RALPH L. BRADLEY II has been promoted to vice-president in charge of management information systems for ITT Commercial Finance in St. Louis.

In his new position, Bradley assumes full responsibility for all of ITT Commercial Finance's systems departments.

Previously he served for two years as international project manager for

Heublein Corp. in Farmington, Conn.

He joined ITT just over a year ago, after serving more than two years as a manager with Peat, Marwick, Mitchell & Co., a national public accounting firm in St. Louis.

Bradley holds a bachelor's degree from Syracuse University in New York and an MBA from the University of Connecticut at Hartford.

RUSSELL SCHROEDER has been appointed vice-president of management information systems and data processing for Shopwell, Inc. in New York.

Schroeder has more than 16 years of experience in the MIS area of the

supermarket industry. He has been with Shopwell since November 1984.

Prior to that, he was employed with Grand Union Co. for seven years, National Tea Co. for two years and Allied Supermarkets for seven years.

He graduated from the Detroit Institute of Technology with a degree in marketing management and holds a graduate degree in commercial banking from the American Institute of Banking.

Shopwell serves the metropolitan New York and southern Connecticut areas operating a chain of supermarkets under the Shopwell, Food Emporium and Value Center names.

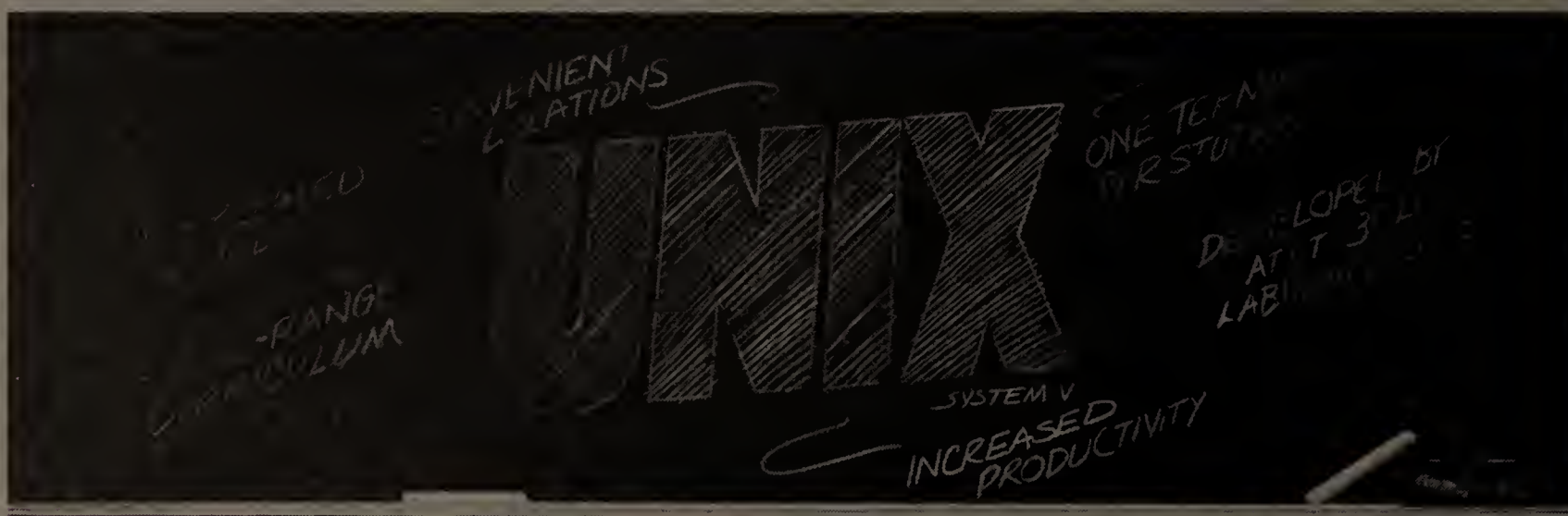
USPS to ditch its electronic mail delivery service

WASHINGTON, D.C. — The U.S. Postal Service (USPS) recently said it will pull the plug on its electronic mail delivery service — Electronic Computer-Originated Mail — Sept. 2, ending the product's troubled three-year history.

USPS officials testifying before the House Subcommittee on Investigations said efforts to sell the electronic mail equipment had been unsuccessful because no financially attractive offers were submitted.

Approximately 900 customers use

the service, which allows computerized tapes to be submitted to the USPS where the information on them is transmitted electronically to a receiving station and a hard-copy message is then printed out and placed in the mail.



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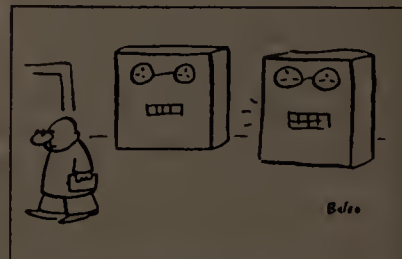
The right choice.

FIG users group meet scheduled

SAN JOSE, Calif. — The Seventh Annual Convention for users of the Fortran programming language will be held Sept. 21-22 at the Hyatt Ritz Hotel in Palo Alto. The convention is sponsored by the Fortran Interest Group (FIG).

Registration for the convention costs \$10.

More information is available from FIG, P.O. Box 8231, San Jose, Calif. 95155.



"Dick Cavett he's not."

NEWS

WASHINGTON
UPDATE

CW Washington Bureau

U.S. senators sponsor
computer education bill

WASHINGTON, D.C. — Leading Democrats in the U.S. Senate recently introduced legislation to provide federal grants for the purchase of computer hardware and software in elementary and secondary schools, with special emphasis on schools with poverty-level children.

The Computer Education Assistance Act of 1985 (S. 1276) was sponsored by Sen. Frank R. Lautenberg (D-N.J.) and cosponsored by Sens. Christopher J. Dodd (D-Conn.), Edward M. Kennedy (D-Mass.), Robert C. Byrd (D-W.Va.), Daniel P. Moynihan (D-N.Y.), Paul S. Sarbanes (D-Md.), Quentin N. Burdick (D-N.D.) and Bill Bradley (D-N.J.).

School districts will have to make extensive plans on how they will use the computers for instructional purposes to get the federal matching grants, Lautenberg said.

The bill proposed an annual budget of \$150 million for buying hardware and software and for training teachers.

If passed, the bill would also provide \$20 million annually to establish teacher training institutes and would authorize the government to evaluate educational hardware and software

Afips offering
NCC telephone
registration

CHICAGO — National Computer Conference (NCC) registration is just a phone call away in 1985.

The American Federation of Information Processing Societies, Inc. (Afips) is offering conference registration by telephone, payable with a major credit card.

Prior to July 11, the toll-free number to call is 1-800-NCC-1985, an Afips spokesman said. Attendees can register July 9-13 by calling 312-567-8000 between 9 a.m. and 8 p.m. "This is to cut down on the lines and to provide an extra service for people registering," the spokesman said.

At the conference, early registration is offered Sunday, July 14, from 10 a.m. to 8 p.m. Registration hours July 15-17 are 7:30 a.m. to 6 p.m.; on July 18, registration is 7:30 a.m. to 3 p.m.

Afips is predicting a strong turnout of 80,000 at this year's conference, and early registration has been heavy.

"That will help ease the lines," the spokesman said. Early registrants are sent through separate lines to pick up their conference materials and preprepared badges, the spokesman said.

The advance registration fee is \$125, and on-site registration costs \$150.

For further information, Afips is located at 1899 Preston White Drive, Reston, Va. 22091.

and then disseminate the results.

High-tech panel to study
effect of export controls

WASHINGTON, D.C. — The effect of national security controls on international technology transfer and the competitiveness of U.S. high-technology industries will be studied by a blue-ribbon panel.

The 21-member panel was convened recently by the Committee on Science, Engineering and Public Policy, a unit formed by the National Academy of Sciences, the National Academy of Engineering and the Institute of Medicine.

The chairman of the panel will be Lew Allen, director of the Jet Propulsion Laboratory of the California In-

stitute of Technology, former director of the National Security Agency and chief of staff of the U.S. Air Force. The announcement said the panel expects to release its report by the fall of 1986.

Other panel members include Thomas A. Christiansen, manager of international trade relations for Hewlett-Packard Co. in Palo Alto, Calif.; John M. Deutch, dean of science at MIT; and retired Adm. Bobby Inman, president of Microelectronics and Computer Technology Corp. in Austin, Texas.

SEC's Edgar to include
public utility firm filings

WASHINGTON, D.C. — The Securities and Exchange Commission

(SEC) recently announced it will expand its electronic filing and retrieval system, called Edgar, to include electronic filings from public utility holding companies.

The SEC approved temporary rules that revise its filing requirements to accommodate computer-generated filings delivered via direct digital transmission, diskette or magnetic tape. "Currently, the commission accepts filings prepared on [more than] 85 different word processors or personal computers," the commission statement said.

The rules require filings made on diskettes or tapes to be accompanied by a sheet of paper with an authorized signature attesting to the accuracy of the filing. Filings made by direct digital transmission will use personal identification numbers as signature symbols.

We'd like to
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The beauties above are two of the most user-friendly pieces in all of techdom. And both are backed by yet another dynamic duo: the sterling quality of Digital and the stalwart service of Leasametric.

The Digital VT220™ terminal, to begin, is the latest model in the cost-efficient VT200 series. This monochromatic model has a sleek look that's slick to use, including programmable function keys and a plain-language menu that's a snap to set up.

The LA210™ printer's no slouch, either. It's probably the most versatile printer ever produced by Digital. This multimode desktop is compatible with all Digital, IBM® and IBM-compatible personal computers. A friend to all, and pleasant to your purse as well: one machine for letter-quality printing, high-speed drafts, and high-resolution bit-map graphics.

All this, arm in arm with great service.

Not only can you get the pair right away from Leasametric—they arrive ready to work. Because we've put them through their paces before we ship them to you. Complete with operator's manuals, cables and the like. Plus, so good friends can keep in touch, we supply

a toll-free number for on-line diagnostics. On-site maintenance if it's needed. And the iron-clad guarantee to replace—immediately—any piece that isn't up to snuff.

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departments together, whether they're in one building or divided among several.

Because WangNet's dual broadband cable is installed much like electrical wiring, adding on new computer equipment is as easy as plugging in a lamp. So whatever networking needs arise, you'll be well prepared to meet them with WangNet.

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nels, the IBM 3270 workstation-to-controller transport, and most video applications.

Considering all the information that's inundating today's office, there's no question that local area networking is a technology whose time has come. And with 50,000 people putting in a plug for WangNet already, the question is – isn't it time WangNet came into your business?

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NEWS

Hacker sentenced for accessing U.S. agency computers

By Mitch Betts
CW Washington Bureau

DENVER — A Los Angeles computer operator who pleaded guilty in May to trespassing in the U.S. Department of Agriculture's Forest Service computers in Colorado was recently sentenced to three years of probation, a \$3,000 fine and 200 hours of community service.

The defendant, 26-year-old Philip Gonzalez Fadriquela, also was required to forfeit his computer equipment and provide a statement to the Forest Service explaining how he gained access to the agency's computers [CW, May 27].

Cathy Goodwin, assistant U.S. attorney, called the sentence moderate,

adding that it makes an important statement that computer crimes will be prosecuted and convictions can be obtained under the 1984 Computer Fraud and Abuse Act.

Sentence handed down

On June 14, U.S. District Judge Jim Kerrigan sentenced Fadriquela to three years of probation and fined him \$1,000 for each of the three misdemeanor charges.

Under the Computer Fraud and Abuse Act, the maximum penalty for each misdemeanor charge is one year in prison and a \$5,000 fine. The law covers unauthorized trespass in U.S. government computers.

Goodwin said the defendant as-

serted at the sentencing hearing that the hacking activity was innocuous and innocent and the result of curiosity. Fadriquela's attorney could not be reached for comment.

The defendant apparently dialed into the Telenet, Inc. telecommunications network and made unauthorized use of an access code to enter the GTE Telenet Communications Corp. network; he apparently then dialed numbers at random until entering a Data General Corp. mainframe at the Forest Service office in Fort Collins, Colo., sources said.

Goodwin said Fadriquela admitted that he got the Telenet access codes from hacker bulletin boards.

Goodwin said Fadriquela's state-

ment to the Forest Service indicated that "there is a way to get in [the service's] system that they didn't even know existed — and they have since taken corrective measures.

"Once he got in [at Fort Collins]," she explained, "he was familiar with the [DG mainframe] ... and knew ways to move around in it with ease. But it was the luck of the draw. It could have been almost anybody's system that he randomly accessed."

The prosecutor quoted Fadriquela as telling the court: "I didn't think I was trespassing because I was still in my own house. It's not like I went to Colorado and walked through their office." He complained that the computer programs did not have notices warning against trespassing, Goodwin said.

Robert Booms, Fadriquela's attorney here, criticized the broad scope of the hacker law. He said his client never went beyond using a password and identification code and never made use of the information stored in the computer. "Like most computer hobbyists, he was more interested in the computer than the contents of the computer," Booms said.

Fadriquela bought a modem around Christmastime last year, Booms said, "and basically went bananas with it," using it for periods of 12 hours or more to enter computer systems.

The trespass was made easier by the fact that the government agency used passwords such as "guest" and used the same word for the user code, the attorney said. "[Anyone] can figure that out," he said.

Discovery of the trespass

The trespass was first discovered by Kevin Abt, director of quality assurance at GTE Telenet in Vienna, Va. [CW, Feb. 11]. Goodwin said Abt "happened to be monitoring the [network] at home on his home computer, and he noticed some activity at unusual hours by the Forest Service — like 3 a.m. — when they normally wouldn't be on-line."

After monitoring the trespasses for about a week and keeping a log, authorities traced the intrusions to the telephone of a Los Angeles optometrist, a GTE Telenet subscriber who was getting unexplained charges on his telephone bills, Goodwin said.

"That was our clue, of course, that there was a tap into his line. So we had to physically trace it back to the defendant's house," she said. Fadriquela was arrested Feb. 6.

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"I had an argument with the computer and it fired me!"

NEWS

Upgrade gives drug firm measure of DP flexibility

LEE'S SUMMIT, Mo. — When Pfizer, Inc. opted to replace its batch order processing system back in 1983, the pharmaceutical company's Agricultural Division here had to decide whether to upgrade its own operations simultaneously.

The Pfizer Agricultural Division is a supplier of animal health products. Manufacturing, distribution and sales offices are located here; corporate headquarters are located in New York.

Faced with an obsolete corporate product distribution system and an under-powered local IBM System/3 small-business system, the company considered first replacing the IBM computer here just to handle the non-distribution applications, and then upgrading the in-house-developed corporate distribution system, said Robin Sitver, manager of financial analysis and systems development. Sitver headed a task force that evaluated product alternatives.

"The old system couldn't handle inventory control. It did order processing, but that was in a batch environment. There was no on-line edit checking or other state-of-the-art features. It couldn't handle our marketing programs, so most of our pricing was done manually. It did check inventory availability and back orders, but it really didn't offer automated lot control. Tracking orders was difficult, and although there was some credit checking, it wasn't as sophisticated as what we're doing now," Sitver said.

System upgrade as option

Upgrading the system here to handle distribution and giving the division an independent distribution system was Pfizer's other option, Sitver said. Because of the division's size and its business methods, Sitver and the task force chose to look for a customized inventory control and distribution system for an IBM System/38 at the facility here.

Because the Agricultural Division is seasonal and tends to ship larger but fewer orders than sister divisions in more conventional pharmaceutical markets, its order processing and pricing requirements did not mesh with those of the corporate system. Sitver explained, "We have several different product groups and many different channels of trade in which we conduct business. So at any one point in time, we have many specials. As a result, our pricing is often somewhat complicated.

To help with the software selection, Sitver and others on the task force interviewed major users in five depart-

ments. "We took everyone's wish lists and used [them] as requirements for our vendor," she said. The ability to implement different pricing and order requirements was another consideration, Sitver noted.

Of the three systems examined, including a proposal for an IBM customized program, the Agricultural Divi-

sion selected Friedman & Associates' Customized Real-Time Installed Software Products (Crisp) program.

Flexible pricing structure

According to Sitver, the Crisp pricing routines allowed the company to set up a flexible pricing structure. "We certainly know we have fewer errors. In the past,

85% of all our pricing was done manually. Now it is all done by computer."

Editing at order entry for such variables as correct price, invalid product numbers, incorrect multiples, customer eligibility and the presence of promotional codes saves time, Sitver said. "Previously, such errors would not have been caught;

the order would have been sent to our batch system. Then it would be rejected, then resubmitted. At that point, you would have lost half a day," she said.

Crisp provided inventory control and tracking and includes automatic lotting of orders on a first-in/first-out basis. The system is

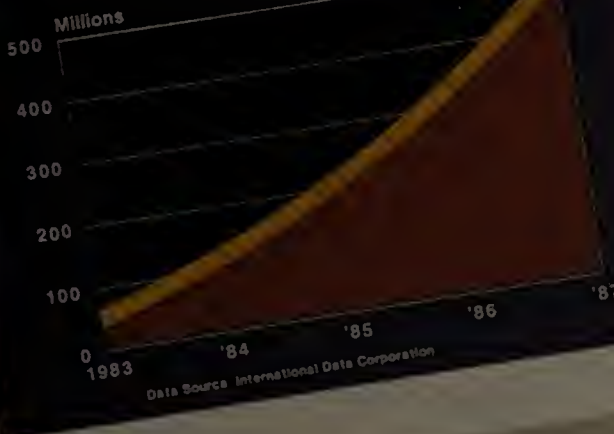
See **BATCH** page 30

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professionally typeset. In fact the LN03 characters are so well formed, they're recognized by Optical Character Readers with no problem at all.

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Two resident typefaces give you no fewer than 16 different sizes, styles and pitches, while optional ROM cartridges let you add just about any face or font you might consider. Including your own custom designed faces. You can even down-line load your own character set or custom

designed graphics fonts to print your logo, letterhead or forms. If you like, the LN03 can print sideways, down the length of the paper as well as across, to accommodate spreadsheets, compiler listings, graph captions or other special effects.

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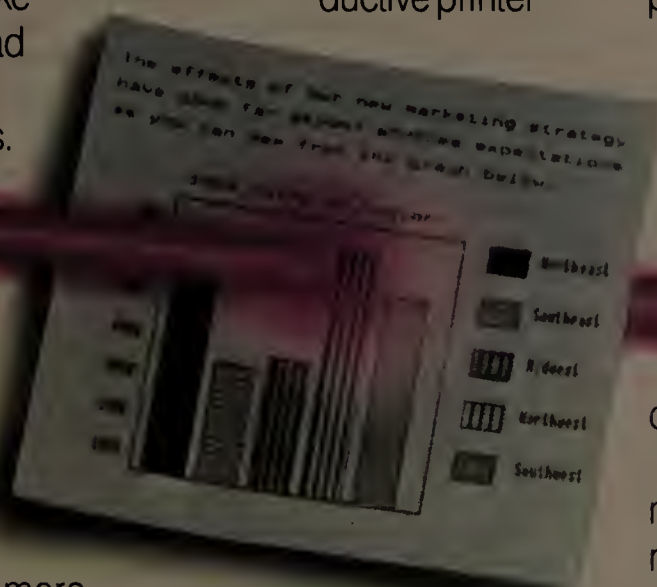
and annoy workers even in an open office.

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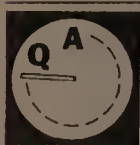
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NEWS



TURNAROUND TIME

Larry Long

Q The weakest of three candidates for a programming manager's job graduated from the same college as my boss, a vice-president. They hit it off very well, and my boss made it clear whom he wanted hired. However, the choice is mine, and I feel that either of the top two candidates are far superior to my boss's choice. What would you do?

Don't let your boss's personal bias get in the way of your own good judgment. Hire the person whom you want.

Q My present position is computer programmer/operator and has been since June of 1978. I'm the remaining programmer out of two who maintained all systems. Because of a recent merger, the present systems are being eliminated and replaced by software, which requires no programming, from an outside vendor.

My experience is in Singer System Ten assembler language. Singer dropped out of the computer market in the early '70s, and there is little, if any, need for a Singer programmer.

For the past year, I have mailed more than 50 resumes to various programming advertisements. I have also sent resumes with descriptive letters explaining my background to three different em-

ployment agencies. To date, I have not received one interview. I thought that with a strong background in an assembler language I would be able to acquire a new programming position by now. Instead, I can't even get an interview.

If you have any ideas, I would be glad to try them.

In a resume, you want to put your best foot forward. In a small shop, you have gained experience as a systems analyst, programmer and operator. The fact that you have Singer experience is irrelevant in most instances and, perhaps, is perceived as a negative attribute by some. Emphasize hardware experience when it benefits you to do so, deemphasize it when it does not. In this case, the Singer experience will not be perceived as an asset.

To strengthen your resume, I

would recommend learning at least one more language and gaining some data base proficiency. A good programmer, when making a conscientious effort, can achieve a solid base in a language within a couple of weeks. You may need to attend a seminar or enroll in a college course to gain data base expertise.

You may have the basic skills, but your experience is inconsistent with market demands, so you may have to become a bit of a salesman to get your foot in the door. Once that happens, you can demonstrate your broad range of experiences as well as your willingness and ability to learn.

Q I've worked with a commercial software company for almost 10 years. Two years ago, I changed jobs from creating software to marketing it. Yesterday, I received my first call from a headhunter, presumably because one of my products has been very successful this year.

She told me that a well-known software company was seeking someone with marketing experience. She said she felt that with my track record I would probably get the job if I interviewed for it. The position pays 50% to 70% more than my current salary. Although I am happy here, my wife and I are very enthusiastic about the possibility of a large jump in income.

I have no experience in dealing with headhunters and don't wish to discuss this with my friends at work. Does a headhunter really know if I will get the job? Is this position too good to be true?

Search firms present candidates for consideration. One method of finding candidates is the blind call. She doesn't know whether you will be invited for an interview, much less get the job. I would guess that there really is an opening and that the salary range was portrayed accurately. For the more traditional technical positions, this is not always the case.

Long, president of Long and Associates, is a consultant, lecturer and author in the field of information services. If you have a question you'd like him to address, send it to Larry Long, Editorial Department, Computerworld, P.O. Box 880, Framingham, Mass. 01701.

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equipped with a traffic check function that allows the division to consolidate orders for favorable freight rates. According to Sitver, "The bottleneck has gone from the shipping office to the floor. The system lots the orders faster than the people on the floor can pick them."

The software program handles the division's distribution. According to Sitver, orders are shipped and recorded into the system. "The invoice is generated, notification is sent to New York, and all corporate systems are updated."

According to Sitver, "We can handle situations with this system that we couldn't with the batch system. Now there's a lot of inquiry capability. And if you have to change customer information — name, address, special instructions — all that is done on-line."

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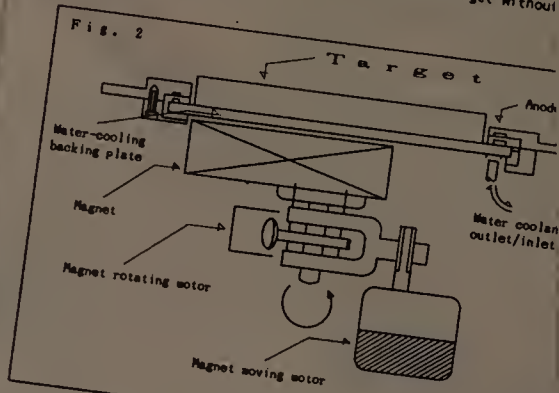
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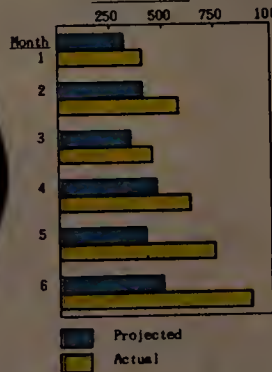
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NEWS

INTERNATIONAL
REPORT

CANADA

TORONTO — A \$500,000 agreement has been signed between publisher Jack McClelland & Stewart Ltd. and Apple Canada, Inc. The publisher will introduce 35 Apple Macintosh 512K-byte microcomputers, Apple Laserwriter printers and the Appletalk personal network into its operations over a nine-month period. By April 1987, the publishing company plans to be fully automated, both in its publishing operations and in its general business practices, with at least 50 Macintoshes linked to a minicomputer. The publisher followed *Equinox*, *Canadian Business Magazine*, *Harrowsmith* and *Canada's Globe and Mail*, which also opted for Macintosh.

TORONTO — The Ontario Securities Commission is pushing Canada's over-the-counter trading community toward automation. The regulatory body for the Canadian brokerage industry plans to set up an electronic quotation system, called the Canadian Over-the-Counter Automated Trading System, in conjunction with the Toronto Stock Exchange by the end of this year.

ITALY

MILAN — The Milan fairgrounds has been selected for the first Italian demonstration of a "wired city." A 640-

km network of optical fibers will link a program production and distribution center with 14 user sites around the grounds. The experiment is being conducted by Italtel, the largest telecommunications manufacturer in Italy, and Sip, the Italian operating company for communications services.

Each user site in the network will consist of a telephone, a television screen, a video camera and a microphone and will provide interactive communications between users and the TV production center, a spokesman said.

The \$5 million project will provide access to 19 television channels, according to Italtel. During the first 10 days of the experiment, more than 30,000 requests for broadband services were conveyed to the production center, Italtel said.

JAPAN

TOKYO — Toshiba Ltd. has unveiled the Tosbac G8050, a four-processor superminicomputer intended for computer-aided design and manufacturing applications. The system reportedly operates at 5.6 million instructions per second, features up to 4G-bytes memory and runs Fortran and AT&T Unix-based software under the vendor's OS/V operating system. The machine is expected to ship in October.

TOKYO — Seibu Information Center Ltd. has introduced a voice-mail service here. The pilot system has been in operation since April at the Seibu Department Store, a subsidiary here. The Seibu service is called Den-

gon-Kun. Seibu has also announced plans to implement a high-speed digital private line between Tokyo and Osaka this fall.

SWEDEN

STOCKHOLM — The typical Swedish computer criminal is 35 years old and has no drug problem or criminal record, according to a recent report on computer-related crime from the National Council for Crime Prevention here. The report said the criminal is the faithful "old servant" who has worked at the company for more than 11 years.

STOCKHOLM — All copying of computer software should be forbidden, including copying for personal use. So said the Swedish distribution company LKD, which recently presented its ideas to the Swedish Copyright Commission here. If copying were permitted, it could mean enormous losses to software companies, LKD argued. Sweden's traditional copyright protection does not include personal use and is not adapted to protection of software. "A book is always protected by copyright law and can never be copied so that the copy looks exactly like the original. A computer program can and should, therefore, be protected," an LKD spokesman said.

STOCKHOLM — IBM has announced plans to build a printer manufacturing facility here in Sweden. The plant will build IBM 4245 models 12 and 20 printers, according to Karl-Erik Johansson, who is in charge of new products at IBM Sweden. The facility will also create 30 new jobs.

STOCKHOLM — The Central Administration of Property Data (CFD) here was recently asked to create and manage a property registration system for the government of Singapore. The CFD will send 85 consultants to help design a data processing system for the registration authorities in Singapore, who are just about to automate their operations.

STOCKHOLM — Sweden's study on the vulnerability of a computer-dependent society has recently fallen under attack by Minister of Defense Anders Thunborg. The minister argued that the International Federation for Information Processing's efforts have not succeeded in raising the consciousness of government workers and the public at large about Sweden's vulnerability in the state departments.

WEST GERMANY

puter, Inc.'s subsidiary here is tightening its belt. Effective June 30, Apple GmbH will close its West German offices in Dusseldorf, Frankfurt, Stuttgart, Hamburg and here, it was learned. Nine regional sales managers will pick up the business from these closings.

NUREMBURG — Philips Communications AG publicly praised the West German Postal Telephone and Telegraph authority for its "innovative strength" and its "cooperation and support in implementing new networks and services." Philips Communications is a German subsidiary of the Dutch communications giant, with worldwide revenue of \$5 billion.

BONN — A federally funded project to promote high-tech research and development is under way here. Some \$150 million has been earmarked for the project, titled "Using Microelectronics," which is intended to help young companies.

More than 3,000 companies have already applied for the the R&D grants, and more than 2,400 were accepted, a spokesman said.

DUSSELDORF — Software pirates have cost Data Becker GmbH between \$10 million and \$13 million, estimated Achim Becker, the software retailer's general manager. The sum is roughly equivalent to the firm's 1984 revenue, Becker said. While software protection has been a widely discussed topic in West Germany, legislation was enacted only recently, allowing West German software houses to copyright their products.

MUNICH — Job control software packages are used in only 20% of West German computer centers, according to a recent survey by Diebold Group GmbH. Of 7,500 mainframe computer installations surveyed, only 200 use job control software. The remaining 80% rely on manual commands from computer operators, the survey said.

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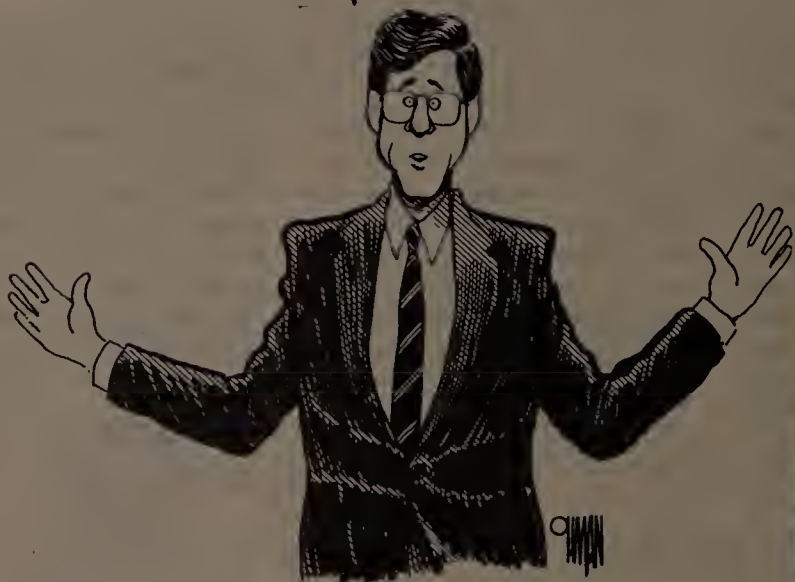
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1. BUSINESS/INDUSTRY (Circle One)

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20 Finance/Insurance/Real Estate
30 Medicine/Law/Education
40 Wholesale/Retail Trade
50 Business Service (except DP)
60 Government—State/Federal/Local
65 Public Utility/Communication Systems/Transportation
70 Mining/Construction/Petroleum/Refining
75 Other User

Vendors

- 80 Manufacturer of Computers, Computer-related Systems or Peripherals
85 Computer Service Bureau/Software/Planning/Consulting
90 Computer/Peripheral Dealer/Distributor/Retailer
95 Other Vendor

2. OCCUPATION/FUNCTION (Circle One)

- 11 President/Owner/Partner/General Manager
- 12 VP/Assistant VP
- 13 Treasurer/Controller/Financial Officer
- 21 Director/Manager/Supervisor DP/IMS Services
- 22 Director/Manager of Operations/Planning/
Administrative Services
- 23 Systems Manager/Systems Analyst
- 31 Manager/Supervisor Programming
- 32 Programmer/Methods Analyst
- 35 OA/WP Director/Manager/Supervisor
- 38 Data Comm Network/Systems Mgmt
- 41 Engr/Scientist/R&D/Tech Mgmt
- 51 Mktg Sales Reps/Sales/Marketing Mgmt
- 60 Consulting Mgmt
- 70 Medical/Legal/Accounting Mgmt
- 80 Educator/Journalist/Librarian/Student
- 90 Other

3. COMPUTER INVOLVEMENT (circle all that apply)

Types of equipment with which you are personally involved either as user, vendor or consultant

- A. Mainframes/Superminis
- B. Minicomputers/Small Business Computers
- C. Microcomputers/Desktops
- D. Communications Systems
- E. Office Automation Systems

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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NEWS



CALENDAR

WEEK OF JULY 21

JULY 22-23, FORT LEE, N.J. — **CICS/VS Performance and Tuning.** Contact: On-Line Software International, Inc., Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024. Also being held July 29-30 in Boston.

JULY 22-24, CHICAGO — **1985 Summer Computer Simulation Conference.** Contact: Society for Computer Simulation, P.O. Box 17900, San Diego, Calif. 92117.

JULY 22-24, CARY, N.C. — **SAS Micro Language.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

JULY 22-24, ST. LOUIS — **Standard Network Protocols: International and National Packet-Switching Networks.** Contact: Data-Tech Institute, P.O. Box 2429, Lakeview Plaza, Clifton, N.J. 07015. Also being held July 29-31 in Boston.

JULY 22-25, FORT LEE, N.J. — **Vtvm: From Start to Finish.** Contact: On-Line Software International, Inc., Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024. Also being held July 22-25 in Los Angeles.

JULY 22-25, WASHINGTON, D.C. — **IMS/DC (Data Communications) Programming.** Contact: On-Line Software International, Inc.,

Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024

JULY 22-25, SAN ANTONIO — **CICS/VS MRO/ISC.** Contact: On-Line Software International, Inc., Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024. Also being held July 22-25 in Denver and July 29-Aug. 1 in Fort Lee.

JULY 22-25, ATLANTA — **CICS/VS Application Design.** Contact: On-Line Software International, Inc., Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024. Also being held July 29-Aug. 1 in Chicago and Los Angeles.

JULY 22-26, SAN FRANCISCO — **Siggraph '85: The 12th Annual Conference on Computer Graphics and Interactive Techniques.** Contact: Siggraph '85 Conference Services Office, 111 E. Wacker Drive, Chicago, Ill. 60601.

JULY 22-26, BOSTON — **CICS/VS Internals.** Contact: On-Line Software International, Inc., Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024. Also being held July 22-26 in San Antonio and July 29-Aug. 2 in Atlanta and Denver.

JULY 22-26, CHICAGO — **CICS/VS Application Programming — Command Level.** Contact: On-Line Software International, Inc., Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024. Also being held July 29-Aug. 2 in Fort Lee; Los Angeles; and Washington, D.C.

JULY 22-26, NEW YORK — **Data Base Development Workshop.** Contact: Elise Rabalais, Learmonth & Burchett Management Systems, Inc.,

Suite 405, 2800 N. Loop W., Houston, Texas 77092.

JULY 22-26, HOUSTON — **Project Development and Control Workshop.** Contact: Elise Rabalais, Learmonth & Burchett Management Systems, Inc., Suite 405, 2800 N. Loop W., Houston, Texas 77092.

JULY 23-25, DALLAS — **SAS Basics Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

JULY 24-25, FORT LEE, N.J. — **Recovery/Restart.** Contact: On-Line Software International, Inc., Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024. Also being held July 31-Aug. 1 in Boston.

JULY 24-25, DALLAS — **SAS Report Writing.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

JULY 24-26, PARSIPPANY, N.J. — **Data Processing for the Non-DP Manager.** Contact: Chubb Institute, P.O. Box 342, 8 Sylvan Way, Parsippany, N.J. 07054.

JULY 24-26, WASHINGTON, D.C. — **Financial Information Systems: The New Generation.** Contact: National Institute for Management Research Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

JULY 24-26, WASHINGTON, D.C. — **Financial Information Systems — Integrating Personal Computers.** Contact: National Institute for Management Research Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

JULY 24-26, CARY, N.C. — **Principles of Regression Analysis.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

JULY 25, COLUMBUS, OHIO —

DOS/VSE Working With Shared Dase. Contact: Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

WEEK OF JULY 28

JULY 28-AUG. 1, OTTAWA — **The Urban and Regional Information Systems Associations' (Urisa) 23rd Annual Conference.** Contact: Urisa Secretariat, Suite 300, 1340 Old Chain Bridge Road, McLean, Va. 22101.

JULY 29-30, ST. LOUIS — **Southwestern Bell.** Contact: Telestrategies, Inc., P.O. Box 811, McLean, Va. 22101.

JULY 29-30, NEW YORK — **Integrating Voice and Data in the Private Branch Exchange.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

JULY 29-AUG. 1, NEW YORK — **IMS/DB (DL/1) Application Programming.** Contact: On-Line Software International, Inc., Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

JULY 29-AUG. 2, PARSIPPANY, N.J. — **CICS Command-Level.** Contact: Chubb Institute, P.O. Box 342, 8 Sylvan Way, Parsippany, N.J. 07054.

JULY 30-AUG. 1, CARY, N.C. — **SAS Basics.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

JULY 30-AUG. 1, CARY, N.C. — **SAS Programming for New Computer Users.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511. Also being held Aug. 12-13 in Toronto.

ECONOMY

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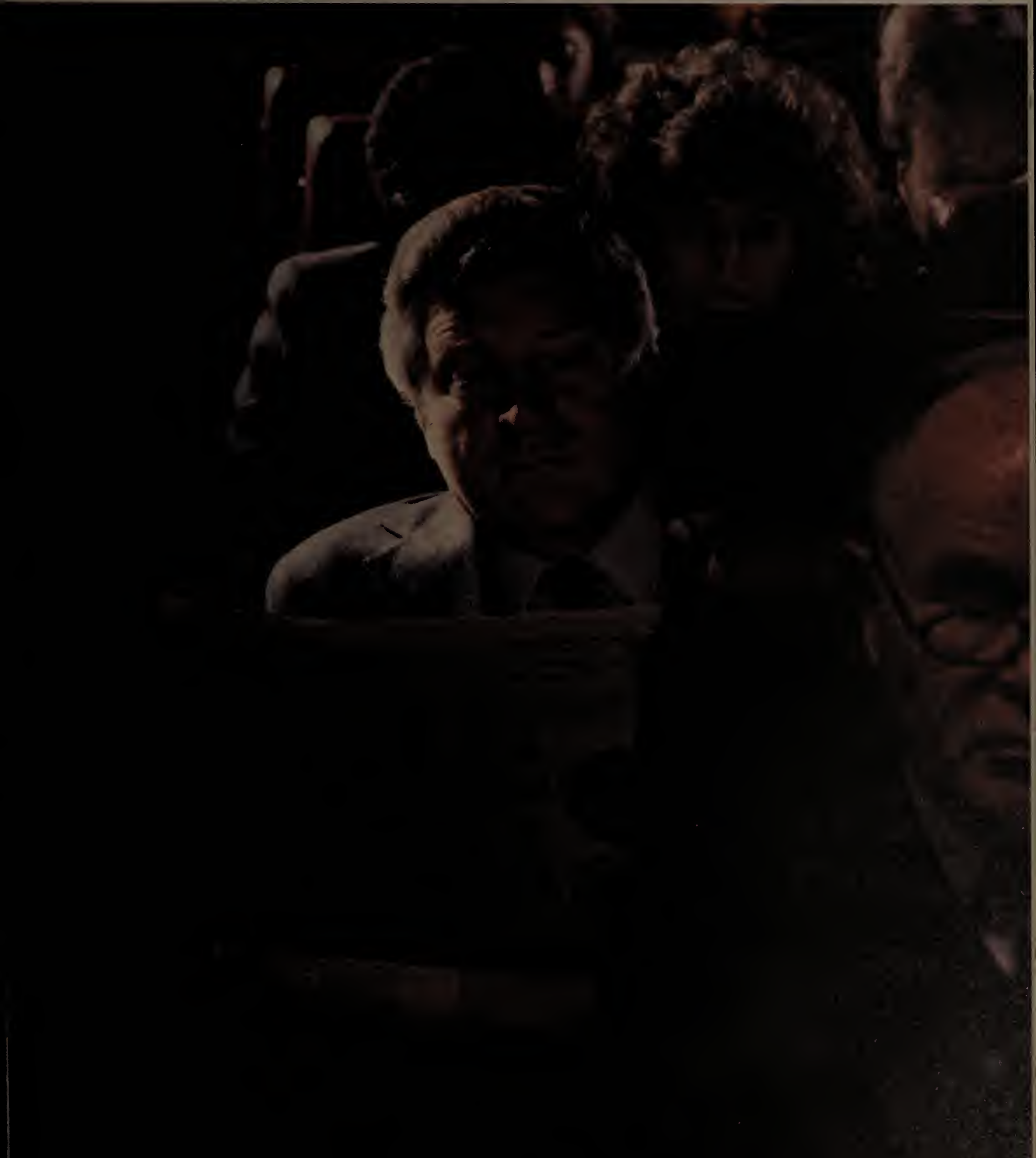
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EDITORIAL

DP's soldiers of fortune

'These are the times that try men's souls.'

— Thomas Paine

At a time when the U.S. economy is chugging along slowly but steadily after two years of rapid growth, the computer industry is mired in what is developing into the muddiest rut in its history.

The bad news pouring in so fast convinces us that this is a bad situation about to get worse. The massive layoffs at industry mainstays like Wang, DG and Apple (see story page 1) appeared in no analyst's crystal ball as recently as six months ago.

And the ongoing misery in the chip industry — which has triggered similar massive layoffs at Intel, TI, National Semi, Synertech and Signetics — has come at a time when most analysts had predicted an upswing. Instead, these companies' performance, a bellwether of things to come, attests that the situation will get worse before it gets any better.

The computer companies certainly have their problems, but how about you, the DP manager? In Thomas Paine's days — those grim years of the American Revolution — success came to those who learned to take advantage of turmoil. Those people assessed the global situation accurately and then saw how their personal fortunes could be maximized against such a stormy backdrop.

You can call it the shark ethic — eat the wounded — but there are a lot of ways you can take advantage of a climate that, over the next year or so, can truly be called a buyer's market. Virtually every vendor, from IBM to add-on board makers, will be hungrier than ever for your business. Alert yourself and others with buying power in your organization to the breadth of the industry's current dilemma, and you will have a leg up on any vendor trying to sell to you.

Look for and be wary of the following:

■ **High-pressured sales.** Some might say that every sale is a high-pressured one, but sales staffs will be under more pressure than ever in the coming months. IBM, for example, brought 400 sales representatives this month to a banking conference, which drew only 3,000 other attendees [CW, June 10]. For the companies that *have* announced layoffs — which does not include IBM — the coming six months might spell out the terms of long-term survival.

■ **Product delays.** With companies laying off 10% and more of their work forces, there are going to be delays. Be wary of anything other than firm delivery dates for equipment ordered.

■ **Degrading service.** In more than one case in the past, we have seen the service and maintenance end of a vendor's business begin to slide when trouble brews. This is by no means the rule, but it's something to watch out for.

■ **Great opportunities with IBM/great opportunities beyond IBM.** DP managers may lean more heavily toward Big Blue, observing that IBM is definitely in this for the long haul. Coupled with the fact that IBM will make its products as attractive as possible to meet its very lofty sales projections this year, this strategy has merit. But on the other hand, there will be some tremendous jockeying by IBM's competitors to maintain position.

The DP manager who has the needs of his shop and company clearly before him is about to encounter opportunities that he may never see again. You'd have to be blind not to know there's trouble aplenty out there and particularly sharp to turn it to your advantage.



Eyeball to eyeball

LETTERS

System provides 'inside-out' approach

The column "Basic design-phase flaws hinder system development" [CW, June 3] pointed a finger at the naked emperor. Even James Martin has recanted his enthusiasm for fourth-generation languages. Conventional fourth-generation language analysis and design methodologies take an "outside-in" approach: They specify all the single details and let the system generate the application.

The Pick Systems Pick operating system, by contrast, provides four languages for system specification. They are Dictionaries (data definitions), Proc (procedures definitions), Access (retrieval definitions) and Basic (data capture and manipulative definitions).

With these four languages, an analyst can prototype an application iteratively and let analytical

software parse the final source statements to produce the detailed specifications. This is the "inside-out" approach.

A payroll system consisting of 80 functions, with 40 heavy-duty programs covering 30 files, can be built under the following timetable: phase one (all menus), 2 hours; phase two (all menus, screens, file dictionaries and reports), 50 hours; phase three (complete code), 800 hours; phase four (complete documentation), 200 hours.

This time line is typical of robust, custom systems being produced with appropriate software engineering methodologies under the Pick system.

C. David Fischer Jr.
Phoenix

COMPUTERWORLD

Donald E. Fagan
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VIEWPOINT

The MIS alligators are alive and kicking



MANAGEMENT MATRIX

Walter F. Cuirle

I think I last heard this chestnut from an auditor who was swinging the cost-cutting ax in the direction of maintenance contracts. It goes like this: A man is standing on a street corner, snapping his fingers. Another man sees this and, puzzled, asks, "Why are you snapping your fingers?" The snapper answers, "To keep the alligators away." The questioner protests, "But there aren't any alligators around here!" Pleased, the snapper responds, "I know. See how well it works?"

Everyone has recognized this attitude from time to time. It's frustrating at best to have someone opine that part of your work is pointless. It is the kind of conflict you can learn to deal with, but there are some areas in which you are doing nothing simply because you consider the effort pointless. Sometimes you're right to do nothing, but other times there really are alligators out there.

Consider, for example, when there is a supervisory position available within your organization. Most managers prefer to fill such positions from within; the usual reasoning goes that there is less risk in filling such a position with someone whose personality and work you know well. That makes good sense. However, some people assume that filling a position from within means that training is unnecessary. This could be a mistake — this particular alligator is often real.

Let's say you have a senior programmer or ana-

Cuirle is a senior associate with Nicholas DeMaio Associates in Bryn Mawr, Pa.

lyst whom you want to promote to group leader or supervisor. The assumption is that because this person has worked under a group leader or supervisor, he knows at least the rudiments of the new job. But if you think about it a minute, you'll realize that a programmer sees only the part of the supervisor's job that affects the programmer — schedules, for example. Work done in other areas, such as regular reports to management or users,

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All you really need is some kind of a schedule that puts the supervisor, who produces the deliverables, in touch with each person who wants them.

may not be so visible to the person coming into the job.

Some people elect to solve this problem of the "what" of a position with a job description. These little documents are certainly necessary, but they are usually intended for general personnel planning. There are more effective ways of defining "what." Suppose the supervisor is responsible for four deliverables a month, such as reports or estimates. Each of these items is due monthly on some particular person's desk at some particular time. Together, these items make up a standing "to do" list for the new supervisor. It's not the whole job, but it establishes just enough structure to get started. Who should make up this list? A good choice is the person to whom the new supervisor is responsible. The outgoing supervisor may be of

help, but then who really has the vested interest in getting the job done right?

Once the "what" of the job is known, it's time to look at the "how." Everybody has a personal bag of tricks. A new job calls for a new bag. Suppose one of the regular deliverables required of the supervisor is a monthly contribution to a budget report.

Where is the best place to get the raw information? What is a typical percentage for overhead? What's a reasonable figure for productivity?

The person who wants the report is usually the one best suited to teach the best way to put it together.

Does all of this mean that you should set up some kind of training for new supervisors? Absolutely. Unfortunately, many people will spend more time integrating some trivial piece of personal computer software into their personal operations than they will on getting a new supervisor settled in. But it does not necessarily follow that the training has to be formal — the idea that training means classrooms and instructions is often what prevents many managers from training supervisors.

It doesn't have to be that complicated. All you really need is some kind of a schedule that puts the supervisor, who produces the deliverables, in touch with each person who wants them. The time allotted doesn't have to be long — maybe only an hour or two a month with each person on the list — and it doesn't have to be particularly structured. Let them work out the topics they'll talk about. But it does have to be inviolate. This business is as important as — if not more so than — any other meeting that may come along.

It's easy, inexpensive and effective. So much so that some people may just tell you that alligator story. If they do, just smile and keep on snapping your fingers. And don't look back.

Poor systems planning impedes micro market growth



HUMAN CONNECTION

Jack Stone

America's changing attitude toward wines and spirits was not the only discussion dealing with sobriety in *Time* magazine's May 20 issue. In its business section, the well-publicized leveling out of sales of personal computers and peripherals was dramatically and soberly retold for the public in nontechnical terms. The average citizen was probably not surprised at the news, having survived the near total demise of the home computer market.

It is refreshing to read a carefully researched analysis of a segment of our noble industry by writers outside of it and savor an unbiased view of the massive deflation of the unruly, unwanted market projections of the expert forecasters within it. *Time's* editors, using engineering terms, figured about a minus 10 decibels' worth of growth difference from 1983 to 1984, contrasting an 11% gain in 1984 with 107% in 1983 — a

situation that strongly suggests why so many manufacturers, software developers and even publishers have left the business for, presumably, more productive pursuits.

Certainly, part of the blame can be placed at the feet of the so-called experts who have talked DP centers, users and vendors alike into believing that the demand for personal computers is insatiable, infinite and inevitable. Their choice words have helped foul up the most creative vendor marketing strategies, the best laid of system plans by information managers and surely the fondest of user expectations.

However, with all the personal computer players hopefully in an abstemious mood, perhaps a few thoughts on the reasons for the slowdown in personal computer sales will confirm what most DP managers have known all along and what many top executives are now starting to accept.

Let's look at several of the many industry axioms that the crystal ball

gazers didn't grind into their forecasting algorithms.

First, users are not paid to plan complex systems, and those who try typically fall short of the mark. Basically, this is because users, by and large, do not focus on organization-wide systems needs, but only on computer services to support their local projects. As a consequence,

they, like all red-blooded American end users, lobby hard for the most powerful, capable machine around without wasting an awful lot of time worrying about such arcane subjects as cost/benefit analyses, feature/function comparisons or certified user needs. Con-

sequently, when the personal computer industry was in its infancy — when the 64K-byte personal computer was all the rage in end-user departments, for example — the impact on the master corporate systems plan was fairly straightforward, and support requirements were generally modest.

But times do change. Now that

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Large systems installed without the blessing of the computer center have greater than a 50-50 chance of being suspect and hence labeled too expensive, overpowered and underused.

IBM Personal Computer AT-class machines are making their way onto corporate loading docks and sneaking into user offices, the systems game has shifted to an entirely new ballpark. Installing these powerhouses and all that is implied therein — integrated software, mainframe links and local-area networks, for example — requires a substantial amount of technical resource that is rarely found in end-user departments and cannot be sprung loose easily from the computer center.

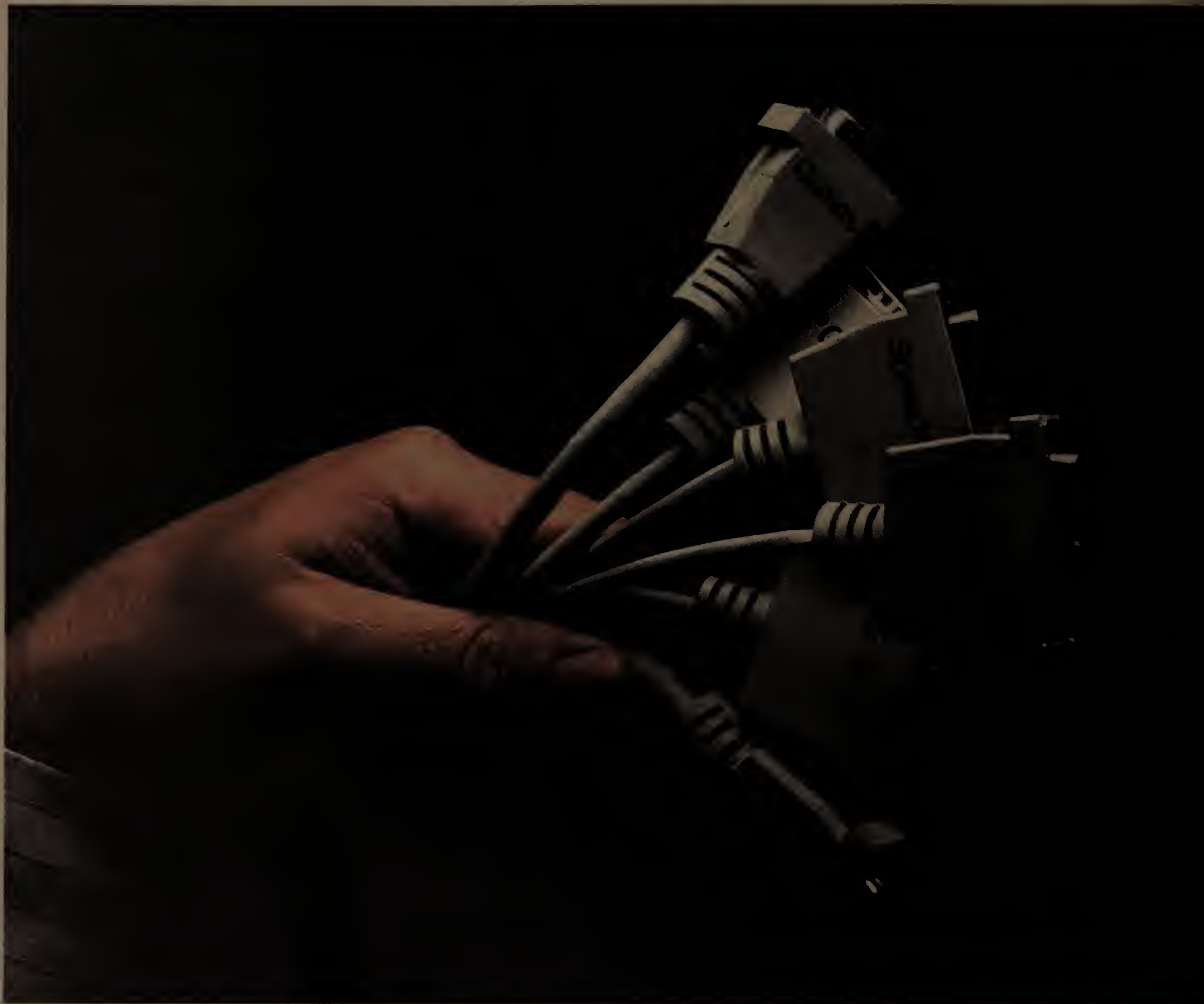
What's the end result? A slowdown on personal computer orders from the larger business customers who have learned that large systems installed without the blessing of the computer center — those that are not part of the corporate plan and are subject to the same scrutiny as all other major acquisitions — have greater than a 50-50 chance of being suspect and hence labeled too expensive, overpowered and underused.

I don't believe for one moment that the demand for more powerful personal computer-class machines has subsided in the least.

I believe that corporate and government leadership is slowing down the pace of acquisition and spending more time in the long-range planning function to ensure that personal computers are properly integrated into the global information systems strategy. ‡

Stone is a Washington, D.C.-based independent management consultant, educator and writer, specializing in DP human communications and personnel development.

This can be the year

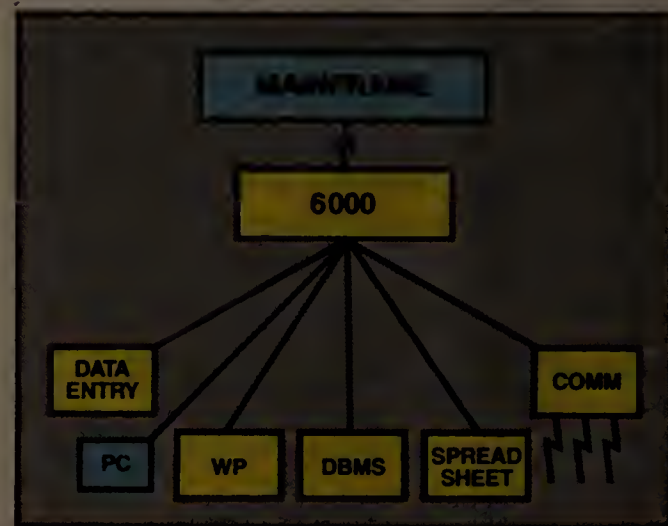


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Les Gilliam

Early disaster plan pays off

When is the most appropriate time in the applications development process to address the subject of disaster recovery? Ideally, it would be in the early stages of design. But pressure from users for an urgently needed system often causes considerations of system security and recovery to be left until implementation time or later.

It would be wise to raise certain issues in the design stage or even earlier, perhaps during the feasibility study. For instance, if a given system is developed, will the company's business operation depend upon the availability of that system? If so, how long will the business be able to operate without it? Designers and users alike concentrate so intently on the functional design and implementation of the

See **GILLIAM** page 47

Firms' software testing practices found lacking

By John Desmond
CW Staff

ORLANDO, Fla. — A majority of companies do not assign staff members to software testing, do not train their staff in testing procedures, do not measure the effectiveness of testing and do not issue reports on test results.

Those were the findings of a 72-company survey on software testing practices conducted by the Quality Assurance Institute at the First National Conference on Software Testing held in Washington, D.C., in November. The institute offers seminars on software maintenance and quality assurance.

William Perry, executive director of the institute, said that "the two most logical steps toward more effective testing are to assign responsibility for testing to one person and to record defects by type and frequency to prevent the recurrence of high-frequency defects."

Respondents to the survey said most programmers have no previous training in testing, that testing needs more management support and that more testing tools are needed to reduce costs and im-

prove quality. Most respondents indicated that no one in their organization was responsible for developing and monitoring the testing process, and few companies devote much development cycle time to testing.

Nearly half the respondents said programs had to meet certain basic requirements before being placed into production. Some requirements were to have users or maintenance personnel approve the programs, review the job control language to ensure it follows standards, present a clean compile of the program, have customers accept the programs or verify the software independently.

Few DP departments formally train their programmers in test methods. But most firms do require applications programmers to develop test plans for systems under development. For the DP departments that measure the effectiveness of testing, testing methods included basic statistics, test review, requirements match, production feedback, regression test streams and discrepancy reporting.

Many organizations perform testing in

See **TEST** page 50

■ Introducing Softscope, a compendium of news from the software front/**42**

■ Teradata beefed up the software for its DBC/1012 data base machine/**42**

■ A version of Pick Systems' Pick operating system for IBM's XA was unveiled by Systems Management/**42**

■ ADR introduced an enhanced release of Vollie, its DOS/VSE application development tool/**43**

■ Joiner Associates enhanced its Jnet networking software linking DEC's All-In-One and IBM's Professional Office Systems/**43**

IBM unwraps enhanced AS

Features allow facility to run under VM, MVS

TAMPA, Fla. — IBM has announced an enhanced version of its Application System (AS) interactive applications development facility with features that allow the product to run under IBM's VM and MVS. IBM also introduced a version of AS available through its Information Network remote computing service.

According to a spokesman, AS provides non-DP professionals with commands, conversational facilities and option windows for use in developing decision-support-oriented and other interactive applications. AS Release 3.0, which was formerly called the VM/Application System, can be run under either VM or MVS/TSO, where it co-resides with other TSO applications. It

can be called from an IBM ISPF dialog or by another TSO application.

In addition, IBM SQL/DS data bases may be accessed by AS Release 3.0 in VM/SP environments, extending the range of data available to users. Also, the graphics facilities of AS have been extended to allow users to take advantage of functions embodied in IBM's Graphic Data Display Manager (GDDM) Release 4. An added DRAW command allows the user to create and display graphics without knowing the syntax or commands of the AS Graph language.

In conjunction with Release 4 of GDDM, AS Release 3.0 provides support for the IBM 3270 Personal Computer/G and 3270 Personal Computer/GX. Release 3.0 also provides extended project control and language editing facilities, enhanced statistical capabilities, larger file structures and additional language support.

See **AS** page 50

SOFTSPOTS

Business status
of artificial intelligence
companies: 1985



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SOFTWARE & SERVICES

SOFTSCOPE

Notes from the software industry front

Digital Equipment Corp. will begin supplying several of Cincom Systems, Inc.'s products, including its Mantis fourth-generation language, Ultra relational DBMS and Control: Manufacturing resource planning system, as a result of a joint marketing agreement recently penned by the two vendors. Cincinnati-based Cincom's tools run on DEC's VAX systems.

■ **Arthur Young & Co. of Chicago,** and Database Design, Inc., noted speaker James Martin's Ann Arbor, Mich.-based software design and development company, have joined to develop a set of microcomputer-based systems design tools. A joint statement from the companies indicated that the initial product offerings will automate the creation and maintenance of data flow, hierarchy and entity-relationship diagrams. An Arthur Young spokesman said the accounting firm plans to take advantage of the tools during its systems design work for clients. The tools are slated to be available through Database Design by year's end.

MH Financial Management Systems, Inc., a subsidiary of Manufacturers Hanover Trust, and Massachusetts Mutual Life Insurance Co. are working to develop an IBM mainframe-based treasury management system to be called Interplex Chief Financial Officer. The system will be the fruit of a joint \$1 million R&D project that the firms made public at the recent Insurance Accounting Systems Association annual meeting in New Orleans. The system, which reportedly will automate treasury functions from input source to general ledger, is slated to reach the market in 1987.

■ **Software International Corp. will** be melding Michaels, Ross & Cole Ltd.'s query software into its software line for the IBM System/38. Andover, Mass.-based Software International said it plans to modify source software for the IBM mini. The modified package, expected to be available by midsummer, will cost \$7,000.

■ **Northern Telecom, Inc. will be providing** Bytel Corp.'s Cogen Cobol See SCOPE page 46

DBC/1012 tool upgraded

LOS ANGELES — Teradata Corp. has announced enhancements to the software for its DBC/1012 Data Base Computer system. Release 3.0 of the software reportedly facilitates data sharing between IBM's MVS and VM operating systems.

Enhancements include interface facilities for IBM VM/SP, a PL/I Preprocessor and DBC/SQL, a relational syntax compatible with IBM's SQL data manipulation language. The DBC/1012 is a special-purpose data base computer that attaches to one or more IBM mainframes and plug-compatible equivalents.

The VM host software facilities allow users of one or more VM mainframes to access relational data bases

stored on the DBC/1012. The features of the VM interface are virtually identical to those supported for MVS, so that DBC/1012 users under MVS or VM need no retraining, the vendor said.

The PL/I preprocessor permits high-level, set-oriented relational data base requests to be embedded within PL/I source programs without the need for calls or special linkages.

The price for a complete host software for the DBC/1012, including Release 3.0, the PL/I and Cobol preprocessors, batch report writer and the MVS/CICS interface, is \$60,000.

Teradata is located at 12945 Jefferson Blvd., Los Angeles, Calif. 90066.

Pick release out for XA units

ROSEMONT, Ill. — Systems Management, Inc. has announced Pick/XA, a version of Pick Systems' Pick operating system that runs in IBM Extended Architecture (XA) environments.

Pick/XA is said to allow IBM mainframes to use up to 2G bytes of virtual and real storage and an increased number of I/O channels.

Pick/XA runs as a guest operating system under IBM's VM/XA or on any XA computer, including the

4381, 3080 and the recently introduced 3090 series. Pick/XA will support all peripheral devices supported by VM/XA. Pick/XA is compatible with Systems Management's existing Pick/370 operating system product. Pick/XA is now undergoing alpha testing and is scheduled for release in the third quarter of 1985. Prices have yet to be announced.

Systems Management is located at 6300 N. River Road, Rosemont, Ill. 60018.



SOFTWARE & SERVICES

Joiner enhances Jnet for DEC VAX/VMS

MADISON, Wis. — Joiner Associates, Inc. has announced Version 2.0 of its Jnet networking software for Digital Equipment Corp. VAX/VMS systems. Version 2.0 links DEC's All-in-One Office Menu and IBM's Professional Office System (Profs) to provide electronic messaging.

Version 2.0 succeeds Version 1.2, which allows transfer between VAX/VMS and IBM/VM systems. According to a spokesman, Version 2.0 allows bidirectional mail exchange between VMSmail or All-In-One users on the VAX and Profs or CMS Note users on the IBM. The translation between the different mail types is automatic and hidden from the user. IBM and VAX users do not need to know if the addressee's computer is an IBM or VAX system.

Version 2.0 of Jnet features a synchronous device driver for DEC's DMF32 interface, increasing the line speed to 19.2K bit/sec. The direct memory access feature of the DMF32 reduces CPU use to one-quarter that of DEC's

DUP11 interface card, supported in an earlier version.

Version 2.0 also includes a Receive command to process incoming files. Receive provides a self-contained interface for automatic recognition and translation of binary or text files in IBM's Disk Dump and Netdata formats.

Jnet employs the protocols used by IBM RSCS Networking Program Product, giving VAX system users the same network communications capabilities as VM/CMS users. Electronic mail, file transfer, batch job submission, remote printing and management of RSCS networks are supported.

No special training is required to use Jnet to originate file transfers, mail and messages. Prices for Version 2.0 of Jnet range from \$1,200 for the Microvax I to \$14,500 for the VAX 8600.

Joiner Associates can be reached through P.O. Box 5445, 732 N. Midvale Blvd., Madison, Wis. 53705.

Enhanced ADR/Vollie introduced

PRINCETON, N.J. — Applied Data Research, Inc. (ADR) has introduced Release 3.4 of ADR/Vollie, its program development system for IBM's DOS/VSE operating system. The product now includes support for IBM's VSE/SP 2, a Virtual Machine Interface and batch utility enhancements.

According to ADR, the Virtual Machine Interface allows ADR/Vollie users to query IBM VM operating system queues and pass Control Program commands directly to the operating system. Query responses are returned to the Vollie user at the terminal.

ADR/Vollie's Batch Utility for its on-line library now allows the Vollie Table to be reloaded into the shared virtual area without an initial program load. The batch utility can now print member content directly from a backup file, rename a group of members or change a member control index in one step, according to the vendor.

Vollie, Release 3.4, is priced at \$20,600.

Applied Data Research is located at Route 206 & Orchard Road, CN-8, Princeton, N.J. 08540.

SYSTEMS SOFTWARE

■ **Software Corp. of America has announced Fastdasd Interactive Interface, the latest version of its Dasd performance and monitoring system. The package runs in IBM MVS environments.**

Fastdasd reportedly reduces Dasd contention by analyzing seek activity and recommending optimal data set placement to improve on-line and batch turnaround time. The product features an Interactive Interface option for IBM's ISPF, said to enhance that product's capabilities.

The Interactive Interface employs a series of panels that prompt the user for parameters necessary to cre-

ate a collection and analysis job stream. Fastdasd allows users to modify reorganization recommendations on-line and see a simulation of resulting improvements. All Fastdasd reports can be reviewed on-line.

Pricing for Fastdasd Interactive Interface begins at \$8,650 for a single-CPU permanent license.

Software Corp. of America, 360 Herndon Pkwy., Herndon, Va. 22070.

■ **VM Software, Inc. has announced Version 1.1 of its VMcenter software, which provides a single source of control for maximizing IBM VM efficiency.**

Version 1.1 features a minidisk utilization analysis utility for IBM

mainframes running VM/CMS. The utility reportedly provides users with reporting capabilities that specify actions for recovering unused minidisk space. The utility also enables users to ensure optimal disk use by analyzing and reporting on selected volumes.

The VMcenter product issues 23 separate reports on a range of minidisk use information. The amount of space to be reclaimed is prescribed. A bar graph shows the number of minidisks at various use levels, giving a snapshot of Dasd utilization.

The price for VMcenter Release 1.1 is \$33,000.

VM Software, Suite 355, 2070 Chain Bridge Road, Vienna, Va. 22180.

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SOFTWARE & SERVICES

■ **Software Concepts, Inc.** has announced **Quick-Tran**, a data compression program for IBM OS, DOS and CMS users.

Using **Quick-Tran**, users can increase data transmission speeds from four to 20 times without equipment upgrades, according to the vendor. Execution parameters can be adjusted to either maximize compression efficiency or minimize CPU time needed to compress data.

A batch utility is run to

compress or decompress the data. Data security is ensured by having **Quick-Tran** on the receiving end decompressing data. A spokesman said files are reduced from 5% to 25% of original size with the compression algorithm.

Compressing data before transmission cuts communications costs, and compressing data on infrequently used files saves disk space, the vendor said.

Quick-Tran is priced at

\$3,500, the vendor said.

Software Concepts, Suite 1450, 250 Piedmont Ave., N.E., Atlanta, Ga. 30308.

PRODUCTIVITY AIDS

■ **Database Technology Corp.** has announced the **Fast Reorganization Utility (FRU)** for its **Com-Pres/IMS** data compression software for management of IBM's

IMS data base management system.

FRU offers users of compressed data bases the ability to unload and reload their compressed data bypassing the normal expansion and recompression process, a spokesman said. In beta tests, users saved up to 70% of normal execution time and up to 50% of CPU time, the vendor said.

FRU is an optional component of **Com-Pres/IMS**, which is licensed for \$3,000 per

CPU processing unit.

Database Technology, Suite G-6, 21 N. Skokie Highway, Lake Bluff, Ill. 60044.

■ **Spectrum International, Inc.** has announced a manual and two software packages for integrating project management with fourth-generation language tools in system development. The products are intended to increase system development productivity and reduce applications backlogs.

The products are **Spectrum/Productivity**, a manual with a project management methodology; **Spectrum/Estimator**; and **Spectrum/Documentor**.

Spectrum/Estimator is an on-line interactive tool intended for developing estimates and plans for systems development projects. **Spectrum/Documentor** is an on-line tool for executing project task deliverables and creating system documentation.

The **Spectrum/Productivity** manual contains procedures for the use of fourth-generation language tools such as screen developers, report generators, graphics and design aids. It contains guidelines for project planning and estimating and descriptions of how to perform each development task.

Spectrum/Documentor runs in IBM TSO/CMS environments; **Spectrum/Estimator**, written in Martin Marietta Data Systems' **Ramis II** fourth-generation language, also runs in IBM TSO/CMS environments.

Prices for **Spectrum/Productivity** range from \$15,000 to \$30,000; the price for **Spectrum/Estimator** is \$23,000; and the price for **Spectrum/Documentation** is \$4,000.

Spectrum International, Suite 150, 6101 W. Centinela Ave., Culver City, Calif. 90230.

APPLICATION PACKAGES

■ **McDonnell Douglas Automation Co.** has announced that its **Unigraphics II** and **Robotics** software is available for **Digital Equipment Corp.'s Microvax II**.

Unigraphics is for computer-aided engineering, design and manufacturing. **Unigraphics II** features three-dimensional capabilities and an integrated data base, a spokesman said. **Robotics** software, which operates with **Unigraphics**, is used to simulate as well as program robots.

The price for the **Microvax II** with **Unigraphics II** software is approximately \$65,000, according to the vendor.

McDonnell Douglas, 325 McDonnell Blvd., Hazelwood, Mo. 63042.

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SOFTWARE & SERVICES

■ Marcam Data Systems Corp. has announced the Pivot RPGIII order processing, invoicing and sales analysis system for the IBM System/38.

Intended as an enhancement module for IBM's Mapics, Pivot can also be used as a stand-alone package, the vendor said.

Pivot provides on-line control of order processing from initial inquiry and order entry to final tracking of an order after shipment. The product also generates sales and commission analysis reports and updates general ledger and accounts receivable systems. The package can automatically print packing lists, bills of lading, shipping labels and invoices.

Pivot costs \$4,200.

Marcam, 19 Crawford St., Needham, Mass. 02192.

■ Perkin-Elmer Corp. has announced that the SPM portfolio management system developed by TNL Data Services, Inc. of New York is now available for PE Series 3200 superminicomputers.

SPM can be used on Series 3200 superminis with the company's OS/32 operating system in Reliance environments. Reliance is PE's transaction processing and data base management system.

SPM provides tools for financial institutions, brokerage houses, family offices, private investment analysts and pension and profit planning departments. The system facilitates portfolio analysis and evaluation, stock and bond trade control, retirement plan control, trust management, foreign exchange trades and control, and dividends and split control.

The base price for SPM is \$25,000, excluding customization.

PE, Data Systems Group, 2 Crescent Place, Oceanport, N.J. 07757.

■ Lasine Financial Solutions, Inc. has introduced a time management application for IBM's System/34 and 36.

The Employee Time Clock is a time management system designed to replace employee time card systems and perform cost analysis by job function, the vendor said.

To operate, employees enter their employee number at a terminal to clock in or out. The system generates a time card that incorporates time rounding, holiday considerations, job costing and other functions.

It costs \$390.

Lasine Financial Solutions, 5224 Goddard Ave., Orlando, Fla. 32810.

LANGUAGES

■ Verdex Corp. has announced U.S. Department of Defense validation of its Ada compiler for Digital Equipment Corp.'s Ultrix operating system on DEC's VAX computers.

The Verdex Ada Development System (Vads) was validated for the Unix 4.2 BSD operating system in December 1984. The Ada compiler is included in the Vads system and can translate Ada language programs into instructions that can be understood by the computer.

Prices for the compiler range from \$7,500 for DEC's Microvax to \$30,000 for the VAX-11/785.

Verdex, 7655 Old Springhouse Road, McLean, Va. 22102.

REMOTE COMPUTING SERVICES

■ Aggressive Concepts has announced a data transfer service available for 200 different microcomputers and minicomputers, including the IBM System/34, 36 and 38 and the Hewlett-Packard Co. Series 125 and 9138.

The service reportedly provides data transfers between incompatible systems and data transfers to tape for microfiche production, long-term data storage and migration to new hardware or software.

Price for the service ranges between \$8 and \$20 per megabyte of data.

Aggressive Concepts, Empire Park, Suite B-210, 1325 S. Colorado Blvd., Denver, Colo. 80222.

■ General Electric Information Services Co. (Geisco) has announced that its Mark 3000 remote computing service now offers IBM's VM/CMS operating system.

According to a spokesman, the Mark 3000 Service VM provides users with development languages, data base and prototyping tools, full screen editors and utilities. Information management tools enables users to perform data entry, organization retrieval and reporting, create electronic spreadsheets and graphics. Users can also perform decision support, document preparation and electronic mail functions.

Ascii CRTs and IBM Personal Computers can access the Mark 3000 Service VM through Geisco's IBM 3270 simulation mode over dial-up lines, the vendor said.

Mark 3000 Service VM includes a

communications register unit (CRU) processing algorithm with a billing rate of 65 cents/CRU during peak hours and \$1.05/megabyte/day for on-line storage.

Geisco, 401 N. Washington St., Rockville, Md. 20850.

■ McDonnell Douglas Remote Computing Services Co. has announced an interface that links its Multiple Report Creation System (MRCS) with Information Builders, Inc.'s Focus fourth-generation language. MRCS is for use with IBM operating systems.

According to a spokesman, with the added interface MRCS users are no longer restricted to separate passes of the Focus data bases each time individual queries and reports

Continued on page 46



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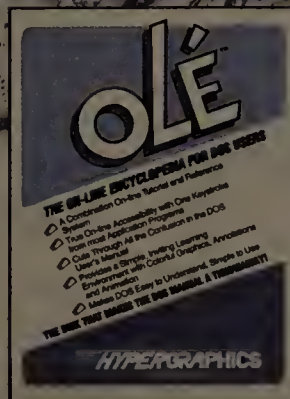
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SOFTWARE & SERVICES

Continued from page 45

are needed. MRCS reportedly handles multiple requests and can produce any combination of files, data bases and reports in one pass of Focus data bases.

The price for MRCS ranges from \$2,500 for users with IBM's VM/CMS operating systems to \$4,000 for users with IBM's MVS/XA.

McDonnell Douglas Information Systems Group, 325 McDonnell Blvd., Hazelwood, Mo. 63042.

■ **Litton Computer Services** has released an option for its Execustation micro-to-mainframe communications software that reportedly allows users to transfer only the updated portions of files rather than retransferring entire files to record changes.

Called Version Control Facility (VCF), the software compares two versions of a microcomputer program, creates a file containing the updates, transmits the update

file to any IBM Personal Computer, Personal Computer XT or AT with access to Litton's remote computing services and combines the update file with the previous version.

A site licensing agreement for VCF costs \$5,000.

Litton Computer Services, 6 Kingsbridge Road, Fairfield, N.J. 07006.

ON-LINE DATA BASES

■ **Informatics General Corp.** has announced Release 2.1 of its Distributed Data Processing System (DDPS) for distributors and wholesalers that use the company's Distribution IV on-line subscription service.

The enhanced DDPS features expanded order processing and scheduling capabilities using an interactive reserved order system, local pricing and invoicing capabilities, an optional report retrieval system and a buyer's workstation.

Distribution IV is a management and control system for medium to large distributors accessed by customers through on-site computer terminals.

The price for DDPS ranges from \$20,000 to \$50,000, based on the number of modules purchased. Distribution IV ranges in price from \$2,500 to \$3,000 per month.

Informatics General, 21031 Ventura Blvd., Woodland Hills, Calif. 91364.

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source code generator along with its recently announced Meridian DV-1 Data Voice System. Shipments of Cogen will begin in the third quarter.

■ **DEC and National Semiconductor Corp.** have begun work on factory automation software as part of a joint development project dubbed Project Odyssey. The software reportedly will control automated semiconductor plants using the Semiconductor Equipment and Materials Institute's equipment communications standard.

■ **Coopers & Lybrand and Cipherlink Corp.** of Los Angeles have made an agreement that enables Coopers & Lybrand to integrate Cipherlink's Any Databridge with the accounting firm's Pre-Audit software. The integrated system will be called the Automated Auditor and will run on IBM Personal Computers and other micros.

SOFTWARE & SERVICES

GILLIAM from page 41

system that they ignore the consequences of system outages. If company operations will be severely impaired or curtailed when the system is unavailable, then a disaster recovery plan is necessary.

In the early days of computing, most applications operated in batch mode. Thus, the process of backup and recovery was fairly straightforward. Outages of a short duration, from a few minutes to a few hours, usually resulted in data center personnel just waiting until the completion of diagnoses and repairs and the restoration of the system. Recovery usually called for rewinding the tapes and restarting the job.

The disaster recovery plan for batch systems relied on off-site backup copies of the operating system, applications program libraries and data files plus a plan for off-site operation at another nearby data center. The backup data center was often another company with similar hardware, with which a mutual assistance agreement had been arranged.

Alternately, batch recovery plans involved a contract for a shell site, that is, an empty computer room where emergency hardware could be installed for interim use until permanent data center operations were restored.

Today, most companies have moved into the world of on-line systems and users are often absolutely dependent on the availability of an application to perform required tasks. This is especially true when the system serves the customer directly or controls some physical process.

Choices for on-line systems recovery

What are the alternatives available for on-line systems recovery? The first consideration in many cases is how well and for how long the business can survive with manual handling of the system services. For example, could customers be served using manual forms and handwritten receipts for some period of time, with master files updated at night or at a later date? Could physical processes be controlled by humans for an interim period until the system is restored?

Second, some companies have multiple data centers with similar or compatible computer systems. In this case, intracompany backup is possible with appropriate telecommunications arrangements and off-site backup of programs and files.

There now exist several companies that offer, for a fee, the opportunity to move your processing to one of their data centers if disaster strikes. The data center would have a computer similar or compatible with yours sitting in a ready state, which is why the facilities are called hot sites. But even this alternative requires that some special arrangements be made ahead of time, such as installing switchable telecommunications lines, and users must allow for a time delay from the out-

age point until the backup system is operational.

For at least one major line of medium-capacity systems there exists a mobile hot site, an operational system in a van, which can be moved to the customer site on short notice. Of course, as in the case of shell sites and hot sites, a prior agreement is required to use these facilities.

Once you have determined that a backup and recovery plan is needed and that at least one of the alternatives is feasible, the detailed disaster recovery plan can be prepared. Of course, having access to a hot site or any other alternative is useless unless you have backup copies of the programs and data files.

The failure of on-line systems while in operation presents a difficult situation in that you have to recover from the point of failure

without losing data. Many of the larger and more advanced data base management systems offer transaction logging to a disk or tape to allow real-time recovery from system failures. But should a disaster strike and destroy the data center, the logging data tape would also be lost and only the information stored off-site would be available.

The disaster recovery planning process should include the identification of applications that are vital to the company's ability to continue in business. From there, the plan will explain the steps to recovery and the responsibilities of all the people involved. Usually, a number of recovery teams are formed to provide an orderly and systematic recovery; first to the interim site and then to the rebuilt, permanent site.

Keep in mind that if the data cen-

ter is destroyed, there is also the possibility that terminals, documentation, user files and the workplace will also be wiped out. An alternate work site for both the user and the information systems group should be identified along with a plan for needed facilities and resources.

A well-prepared disaster recovery plan in an attractive notebook sitting on a shelf, and contracts to provide backup processing do not constitute a complete plan. If at all possible, the disaster recovery plan should be tested by switching processing to the hot site computer and proving to management that recovery can be achieved within the desired time frame.

Also, as systems, staff and facilities change, the recovery plan must be kept up to date if it is to meet the objectives set forth by management.

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Gilliam is an independent consultant based in Ponca City, Okla. He has almost 30 years experience in data processing and is a member of the Independent Computer Consultants Association. He is a regular contributor to Softline.

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SOFTWARE & SERVICES

TEST from page 41

more than one phase of the development life cycle. Most testing was done in the acceptance phase, followed by the programming phase, the conversion/installation phase, the design phase and the requirements phase.

Formal testing procedures

Most data processing departments have a formal procedure for testing changes made during maintenance of programs. Users were most often responsible for testing the functions of applications once in production. Others responsible were independent test groups, data processing quality assurance, electronic data processing auditors and sys-

tems analysts/programmers.

While most companies kept no record of the defects uncovered in testing, a majority did have a formal system for correcting the defects. In order of priority, errors corrected were fatal errors that stopped the system, nonfatal errors and faults that affected a capability but could be tolerated.

Test strategies for on-line data base systems differed from those employed for batch systems. Some users commented that on-line system testing was more sophisticated and more critically reviewed, that on-line systems were tested with an interactive test tool and that users were more involved in testing on-line systems.

A variety of testing documents were prepared by the companies. The documents prepared in or-

der of frequency were system test plans, a list of test cases, a report on testing and a program test plan. In half the companies, test documentation was carried into the maintenance phase for use in testing program changes.

Users listed several ways in which testing could be improved in their organizations. These ways included planning for testing, adhering to test standards, improving requirements testing, incorporating test procedures throughout the system life cycle and winning more management support for testing.

The survey results cost \$5 and are available from the Quality Assurance Institute, which is located at 9222 Bay Point Drive, Orlando, Fla. 32819.



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AS from page 41

AS can be licensed for an initial charge, monthly charges or for a one-time charge. The initial charge is \$53,000, and the monthly charge is based on the number of concurrently signed on terminal users (CSTU). The monthly charge ranges from \$1,700 for 15 CSTUs to \$8,025 for 120 CSTUs. A one-time charge is also based on the number of CSTUs. It ranges from \$101,500 for 15 CSTUs to \$292,500 for 120 CSTUs, the vendor said.

IBM's Information Network group also announced AS Release 7.0, which can be accessed via that remote computing service beginning in mid-November.

Release 7.0 includes licensed and proprietary programs developed to execute on the Information Network, the spokesman said. It can reportedly be accessed via terminals through either leased or dial-up communications lines.

Release 7.0 reportedly features extended high-resolution graphics and statistical capabilities, improved project control and language editing facilities, larger file structures and wider language support. AS Release 7.0 charges are based on use, the vendor said.

For further information, IBM can be reached through P.O. Box 30021, 3405 W. Buffalo Ave., Tampa, Fla. 33630.



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IN DEPTH

WHEN THE COMPANY PICKS A CIO, WILL YOU BE IT?

There's a shortage of qualified candidates to become chief information officer. When corporate management looks for an internal candidate, MIS executives should be ready.

By Roger Sobkowiak

As corporations create a chief information officer position, the predictable scramble begins. Companies comb their ranks for qualified internal employees while executive search firms recruit outside candidates. Typically, both efforts fail.

A shortfall of able candidates exists and will continue to because the most likely candidates for the new post — current MIS directors — have not been groomed for corporate positions. It will be perhaps two to seven years before a new cadre of information systems executives will emerge. The development process will be traumatic and costly. Companies will painfully begin to realize both the individual and corporate changes necessary to manage the computer and information revolution.

The shortfall exists because MIS directors have been trained to be providers of corporate services, not corporate executives. The duties of the CIO are not those of simply managing bigger projects, but include strategically integrating information and knowledge. The CIO reports directly to the president and assumes

IN DEPTH/CHOOSING A CIO

equal status with similar high-level offices in marketing, engineering, manufacturing and finance.

In order to be effective, the CIO must have a deep appreciation for the perspectives and goals of these other functions. And more important, the CIO must be able to merge these perspectives and goals into an overall MIS strategy. If the CIO is an alumnus of one or more of these functions, this integration will be easier than it would be for the nonalumnus. Whoever the CIO is, however, he must perform integrative thinking to be successful.

The CIO will shape his position within the company. It is his prime responsibility to effect a new way of thinking about how work gets done. Therefore, the person seeking to become a CIO must be an agent of change. The irony is that those who understand the implications of creating a chief information officer position and the skills required to do the job are often the people who are the most logical internal candidates. But they hesitate to step forward as candidates because at some fundamental level, they know they are inadequately prepared to tackle this emerging and critical job.

This dilemma leads to the increased possibility that the CIO, if chosen from within the company at all, will be chosen on the basis of his executive skills and general managerial performance — from a business unit or function rather than MIS. When this happens, in-depth understanding of the technology takes a backseat to executive acumen. Aspi-

Comparing positions	
MIS director	Chief information officer
Responsibilities	
<ul style="list-style-type: none"> Managing the applications portfolio as an asset Designing the system architecture Managing diversified computer applications Building management disciplines and executive leadership Developing organization structures Linking business and computer strategies 	<ul style="list-style-type: none"> Setting a direction for information usage and control Influencing/controlling equipment purchases Managing diversity and functional applications of computer technologies Building user-oriented organization components Creating a strategic information plan
Competencies	
<ul style="list-style-type: none"> Creating manager self-image Planning Attending to organization design Attending to subordinates 	<ul style="list-style-type: none"> Creating executive self-image Making corporate decisions Building coalitions Developing managers Developing negotiation skills

rants to the CIO job from within MIS then receive an even stronger confirmation of their unpreparedness to assume the key leadership role.

Two forces

In our efforts with four major corporations, we have worked with many MIS directors and software managers. We have observed the collision of two forces, one dynamic and the other static, that explain why MIS directors are so often poor candidates for the CIO position.

The first factor, the dynamic one, is that companies move through

clearly defined stages of computer usage, but each company moves at its own pace. Nolan and Gibson, in their article published in the *Harvard Business Review* (Jan./Feb. 1974), discussed four stages of computer usage. Their work provides insights into the changing roles within MIS. In each stage, the MIS function assumes greater levels of responsibility, fresh relationships to the corporation and new and demanding mandates.

To be successful in each stage, the MIS manager must acquire significantly different knowledge and di-

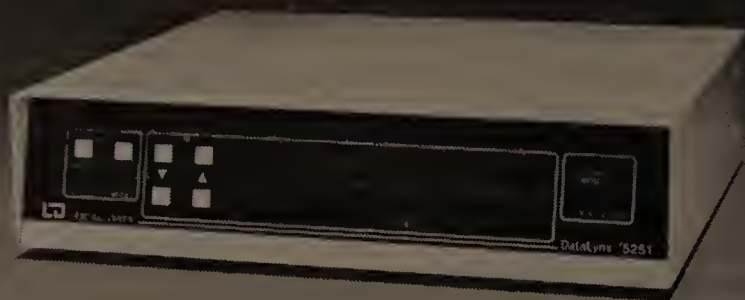
verse skills. The most dramatic shift occurs when the company enters what Nolan and Gibson call Stage IV and creates the position of the chief information officer.

The second factor is the generally uninspected and therefore static notion of a development path consisting of a stationary hierarchy of positions that emphasize technical know-how and through which an employee unswervingly passes in progressing to the top MIS slot. A key objective of any career planning process is to guide the individual to increasingly responsible positions requiring the accumulation of advanced knowledge and highly refined skills.

A typical sequence for MIS jobs would be programmer, systems analyst, team leader, first-line manager and, finally, department manager. Such a sequential path can play an extremely useful role, but its strongest requirement is a stable environment where job predictability approaches certainty. The MIS and software arena is anything but such a stable environment. The consequence is that MIS managers who have followed that path have not been really helped.

In Stage IV, the adaptation of computer technology by corporations is happening so quickly, pervasively and totally that the structural foundation of the MIS function is crumbling. Technology is reshaping the development paths, but most corporations have not been able to take the time to stand back to understand and leverage this dramatic process.

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IN DEPTH/CHOOSING A CIO

Count the number of software organizations that exist outside the traditional MIS organization — in engineering, manufacturing and marketing. Observe the allocation of hardware resources and discover who is making decisions about hardware and software purchases. List the functions that are supported by the central MIS organization. What is happening is that computer technology is not the private domain of the MIS organization, and managing the technology requires extensive knowledge of other business functions as well as collaborative skills.

Successful managers in Stage IV are those that can cope with issues such as technology transfer, user relations, decision systems and new ways to disseminate computer power.

Focus for a moment on two positions: the MIS director in Stage III and the CIO in Stage IV, and think about the responsibilities and the knowledge, skill and behaviors required to excel.

Note that the difference between the two columns (see chart) is the shift from operational to strategic and from technical to overall business considerations.

The implication drawn here is that for corporations concluding that they must develop their candidates internally, the task is formidable. The emphasis is on behavioral change, which is never easy. Simply sending MIS directors to a crash course at a high-quality business school will not achieve the goal.

The differences between being an MIS director and a CIO are principally not of knowledge but in the skills necessary to apply the appropriate knowledge in broader and more complex circumstances. It's a bit like the difference between a child who has been taught to walk and one who has been taught to negotiate a street crossing.

For MIS directors (Stage III) to prepare themselves to be CIOs (Stage IV), they must obtain first-hand, officer-level experiences. The problem is made especially difficult in two ways. First, other functions, such as engineering and manufacturing, are often unwilling to accept the MIS function as an equal; second, the MIS professionals themselves do not yet accept the new role as attainable.

The message for smart corporations is that they must capitalize on current trends, including end-user computing, expert systems, information centers, office technology, computer-aided design and manufacturing and teleconferencing. The proliferation of personal computers is drawing the MIS person out of traditional functional patterns. Technical gurus are and always will be important, but they won't be helping the corporation unless they can be helpful to users.

These trends are causing the MIS function to interact on a daily basis with other business functions, thus broadening its scope, areas of influence and overall business acumen. The leader companies will take advantage of these trends by rewarding managers who can step into the new roles and, at the same time, consciously use these jobs as a training ground to create the new breed of information systems executive. These companies will continually challenge MIS managers to rethink their roles.

The message for the few MIS pro-

fessionals within the ranks who truly aspire to officer levels is simple: Aspirations can be achieved by leveraging technology trends to broaden management skills, while continuing to work toward technical mastery.

For example, MIS people must seek out and create, if necessary, temporary one- and two-year assignments in other business units or functions that are critically dependent upon computer technology as the basis for products and services. They must doggedly pursue opportunities for highly visible projects that contribute directly to the bottom line. They must demonstrate an eagerness to participate in management development, to chair cross-functional task forces and seek opportunities to contribute to key corporate decisions such as those re-

quired in an acquisition, divestiture, merger or start-up. In all possible cases, the aspirant must position his technical knowledge and business insights to form the right combination for making difficult business decisions.

The shortage of CIO candidates from MIS ranks will continue for some time, but not indefinitely. Companies should develop a qualified manpower pool similar to a good major league farm club. They need to strategically place talented technical people who have the necessary interpersonal skills and business perspective in new user-oriented jobs. They need to move computer experts between functions and create new measurement systems to reward technology managers. Other companies will follow as they understand and face the problem and see it as one that

doesn't go away simply by recruiting a candidate from another company.

MIS directors should understand what they need and demand to move ahead. Company chief executives who are about to select a CIO should look long and hard at the MIS talent base that they already have. If they need to go outside the company or outside the MIS function for a CIO, then appointing the person is just the prelude to the management work required to build an MIS organization that is something more than a utility function.

About the author

Roger Sobkowiak is the founder of Software People Concepts, Inc. of New Haven, Conn., a firm specializing in the general management and human resource issues of MIS organizations.

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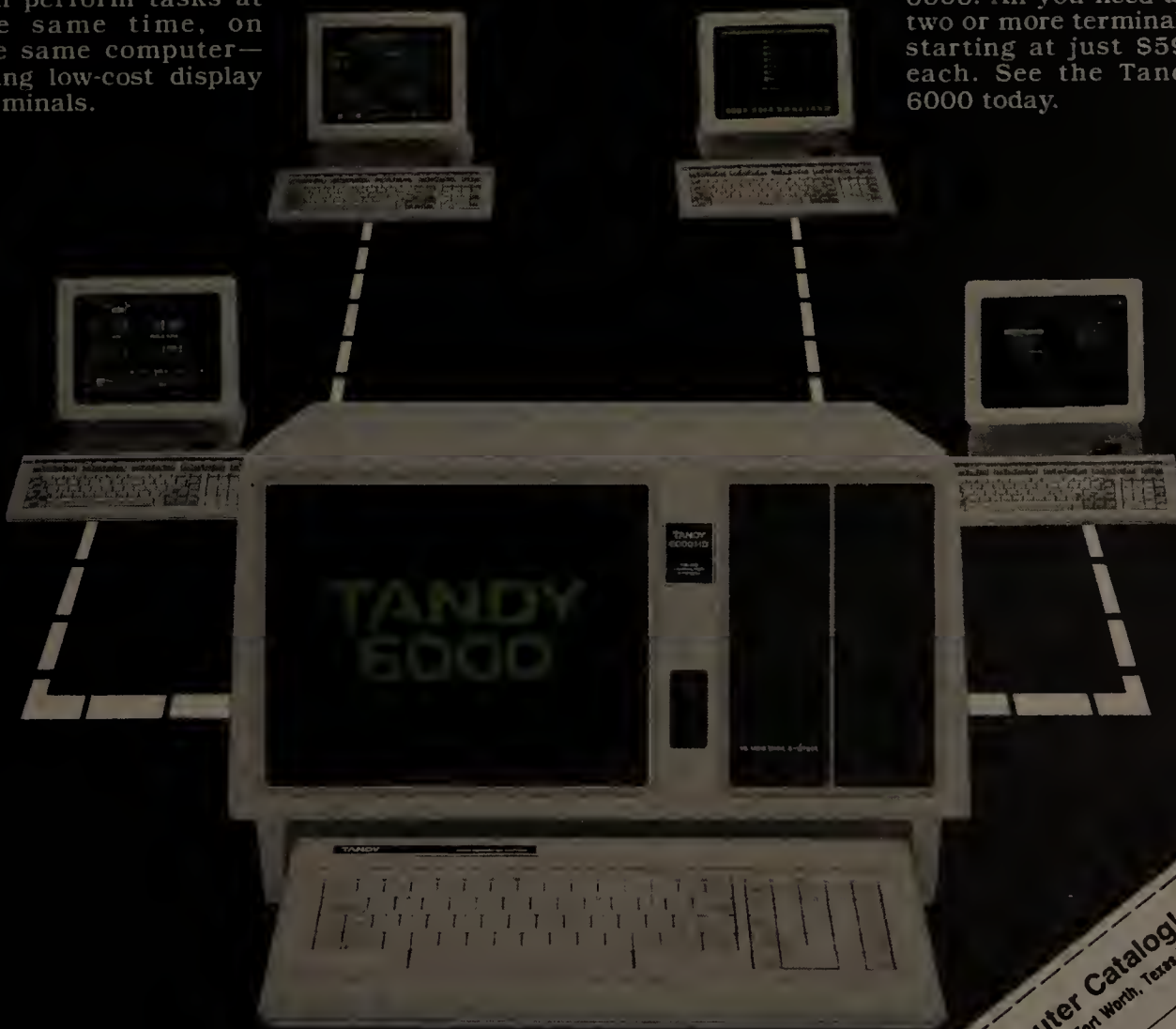
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IN DEPTH

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GETTING MICROS ON TRACK

The long-term use of the personal computer is as an interactive workstation connected to corporate data bases. The role of DP is to make this goal reachable in the shortest time and at least cost possible to the organization.

By William Perry

Many years ago, a corporate controller wrote an article in a magazine about the computer titled "I hate you, computer — You ruined my nice, happy, quiet life." The controller felt in charge of his manual environment, but when the computer intruded, life was never the same again. Now, many data processing professionals feel the same way about the personal computer. There is no doubt it will change the lifestyles of data processing professionals in their organizations.

To many, the personal computer is viewed as a threat. One data processing professional stated that helping the personal computer user was like training your competitor to take your customers away from

Excerpted from The Micro-Mainframe Link: The Corporate Guide to Productive Use of the Microcomputer, by William E. Perry. Copyright © 1985 John Wiley & Sons, Inc. Reprinted by permission of the publisher.

IN DEPTH/GETTING ON TRACK

you. There is no doubt that the computer is a threat to the way business is now conducted, but it is by no means a threat to information processing. The role of computers in an organization will accelerate rapidly because of the introduction of the personal computer.

Economists refer to a market as "elastic" when it can absorb all of the product that is placed in the marketplace. For the foreseeable future, the information processing market is elastic. There is a huge pent-up demand for processing, some of which is currently being satisfied by the personal computer.

When we consider that the personal computer is another information processing tool, then the role of the professional data processor is to provide leadership and direction in the effective use of personal comput-

ers in the organization.

The leadership role requires the data processing function to undertake those strategies and tasks needed to introduce and oversee the use of personal computers in the organization. As such, DP professionals should not wait until the situation is out of hand before acting, but rather should grab the bull by the horns and provide those services and facilities that will encourage potential users to follow those paths shown to be correct through many years of experience.

The direction will be provided in terms of selecting hardware, establishing training programs, developing programs and developing user groups.

The data processing function that provides the leadership and direction will be stronger 10 years from

today than it is today. The function that avoids this leadership role may find that the information processing leadership has shifted to the users.

The data processing leadership role begins by developing a long-range information processing plan for the organization. It is difficult to provide leadership if one doesn't know where one is going. The long-range information processing plan becomes the blueprint for integrating personal computers into the business and then providing the needed direction to ensure that the personal computers, as well as all other aspects of the plan, work effectively.

Long-range plan

In the beginning, there was no centralized data processing. Each operational unit that needed data processed did it internally. Staffs of

clerks in each operational area of an organization performed whatever paperwork was necessary to assist that unit in fulfilling its responsibilities.

When automated equipment came into existence, the time, effort and cost required to utilize effectively that equipment surpassed the capabilities of many departments. For this reason, organizations began to establish central data processing functions. The primary objective of this function was to provide the leadership, direction and expertise needed to process the organization's data on sophisticated equipment.

Recently, this centralization of data processing has begun to break down. The cost of computers has dropped significantly. Therefore, the cost issue for centralization is no longer pertinent for many uses. Computers have been made easier to use, and the skill levels of users have increased. Therefore, the technological barrier, which was a major reason for centralization, is beginning to break down.

One could hypothesize from the current trend that processing is decentralizing and that users will revert to their original role of processing the data they need to fulfill their mission. There is little doubt that some functions will remain centralized, such as payroll, but many could be decentralized and probably should be. After all, the users know more about their business than is known by the central data processing staff.

What's effective

The central data processing function needs to rethink its primary mission within the organization. The mission of doing all of the computer processing is no longer valid. The central function must rethink what aspects of information processing are most effectively done centrally and what are most effectively done decentrally.

The pattern that is emerging is a four-phase personal computer evolution process. If we study this process and then incorporate it into a plan, it shows a very clear mission for the centralized data processing function.

Listed below are the four personal computer phases restated as a long-range plan for the organization:

Experimentation phase — the decentralization of some processing applications. The long-range plan begins with a decentralization of selected data processing applications. The objective of this part of the plan is twofold. First, those functions that can best be done by the users should be done by users. This phase will introduce computing capacity to users, enabling them to identify which functions are best done in a decentralized manner.

Second, the use of the personal computer by users will increase their computer literacy. This long-term goal of the data processing function may finally be achievable through the use of the personal computer.

Stand-alone phase — selection of user-developed, maintained and operated applications. The long-range plan continues by redefining the processing location for application systems. This reallocation of application processing should be mutually developed by the users and the central data processing function. The central function can participate in application selection, provide

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guidance and training and lead users through the takeover of certain computer processing applications.

During this long-range plan phase, users will begin to realize their processing limitations. These limitations will come from three sources:

1. Technological limitations — The users will not want to invest the time and effort to master fully the technology in order to do all types of applications.

2. Hardware/software limitations — The capabilities available on the personal computer do not equal those on the central computer. It is reasonable to expect in the foreseeable future that certain functions that can be readily performed on the central computer will not be possible on the personal computers. While it is expected that personal computers will grow in capacity, they will not rival the capacity of the large central computer in the foreseeable future.

3. Data limitations — Many processes will require large corporate data bases. Users will not want to enter or maintain those large volumes of data. Even if they did, it would create multiple redundant data bases in the organization, which is an ineffective use of organizational resources.

Network terminal phase — eliminate the data limitation. The third phase of the long-range plan should be the elimination of limitations because of data. This can be accomplished by giving personal computers access to the organization's data bases. This access capability will probably be introduced in phases as controls are developed to protect the integrity and security of the centralized data bases. The phase will begin by downloading data and end when data can be uploaded from the personal computers.

Workstation phase — elimination of processing limitations (hardware/software limitations). This phase of the plan will put the processing capabilities of large computers in the hands of users through the introduction of workstations. The workstation will be able to utilize the processing capabilities of the large computer, as well as the data managed by the large computer.

At the end of the fourth phase, the cycle will have gone from decentralization back to centralization. The workstation phase is one of centralized control of processing, but in a manner and form different from that now performed. Currently, users have only minimal control over centralized processing. When the four-phase, long-range plan has been completed, users will have a more active role in the development and use of processing capabilities.

Backbone in future

The technological skill impediment is one that will not be solved by the user in the foreseeable future. It is the knowledge of technology, the selection of technology, the assistance and use of technology and the support of user applications that will be the backbone of data processing in the future. Much of the application development and associated support systems can be developed and implemented by users. What users cannot do effectively is devote full time to understanding and optimizing the use of information technology for the business.

The evolutionary period from centralized data processing to decentral-

ized data processing to distributed processing will be many years in duration. The introduction of the personal computer is merely a step in the evolutionary process of opening computer processing to the information needs of the organization. The speed at which this transition occurs will be heavily dependent upon the role and support provided by the centralized data processing function. Individual users can develop the facilities necessary for their own personal use, but can do little to coordi-

nate an overall corporate effort to expand data processing horizons.

Organizations that lack central direction and the support of data processing professionals may flounder for years in a battle for information supremacy. On the other hand, organizations with strong central leadership will achieve information processing benefits unparalleled in the industry.

The central data processing group must do the following in order to realize the full benefits of informa-

tion processing in their organization:

Action 1 — preparation for decentralized information processing. Major transitions do not occur without detailed planning and preparation. Decentralized information processing is a new concept with no precedents to use for guidelines. The leaders will have to be innovative to be successful.

This corporatewide approach to information processing requires the development of a master plan showing the transitional steps leading from large-scale mainframe centralized processing to a system where the hardware, processing capabilities and information are distributed to the operational areas of the organization.

Action 2 — develop an effective working relationship with personal computer users. The initiative for

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an interaction between the central data processing function and personal computer users should come from the central group. In most organizations, the personal computer users will not know what they need, what questions to ask or what type of working relationship will provide maximum benefit to the organization. This guidance must come from the central function.

Action 3 — gain technical expertise in personal computer technology. Mainframe technology is different from personal computer technology. The capabilities, operating characteristics, uses, controls and other procedures that are effective on mainframe computers may not be effective on the personal computer.

An old adage states, "You will not know what it's like to be someone until you have walked in his shoes." The same adage holds true for an understanding of personal computer technology. Many data processing professionals have changed their attitudes and concepts about the personal computer once they have delved into and learned this new technology.

Action 4 — devote resources and support to the implementation of the long-range computing plan. The plan is only the beginning of the transition to distributed information processing. The plan does not become a reality until action occurs. Many plans are started in organizations, but few are finished. It takes strong support from centralized data processing management and a commitment of its resources to make the plan work.

The plan is the tool and the technique is the method for using the tool. For example, to drive a nail into a piece of wood, we use a hammer as a tool. The technique for using that hammer is as important as the tool, because without the appropriate swing and pressure behind the swing, the nail will not be driven into the wood.

The techniques that should be considered for the four data processing actions give organizations options in executing the plan. For example, a nail can be driven into wood by many small swings or a few very large swings. It may be the individual swinging the hammer who is best equipped to make the decision on technique. For that reason, a variety of techniques are described below for implementing a personal computer plan.

Action 1

The first few personal computers introduced into a business were viewed as toys in the hands of users. While the microcomputers were as powerful as some of the mainframes 20 years earlier,

they were viewed by many as toys whose main purpose was for playing games. This misconception quickly vanished, and the power of the personal computer, as implemented through spreadsheet software, plus a rapidly growing library of other microcomputer software, turned the toy into a valuable decision support tool for the user.

The preparation that the central data processing function must do as a prerequi-

site to optimizing the equipment includes:

- **Mental preparation** — the data processing professional must view the personal computer in the proper information processing perspective.

- **Planning preparation** — a long-range information system plan needs to be developed.

- **Organizational preparation** — the information processing organizational structure needs to be reevaluated

and reorganized to complement the characteristics of the personal computer.

In the performance of this preparatory work, the following techniques can be used by data processing professionals.

Technique 1. Develop personal computer programs. This technique breaks the plan into smaller controllable units. A program is an independent and controllable activity whose objectives can be defined and mea-

sured. Each program should involve establishing requirements, designing the procedures by which the program will be implemented and then implementing and evaluating the effectiveness of the program.

Unless the plan can be divided into controllable and measurable programs, it may flounder because of lack of direction and defined accomplishments. For example, the establishment of a computer store would be a program.



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Data processing professionals learned the same lesson in the systems development process. Prior to phased development with specified deliverables, management could never determine an accurate status of development. This led to extensive overruns and delays. Personal computer implementation can fall into the same traps without an equivalent phased or programmed approach to incorporating the personal computers into

a long-range information processing plan.

Technique 2. Provide personal computers with quality control tools. A quality control tool is a vehicle for use by personal computer users to assess the effectiveness of their work. These tools can be used to evaluate acquired capabilities, as well as to evaluate in-house-developed software and procedures. Examples of these quality control tools include:

- Software installation

tool — provides a series of steps that should be undertaken to implement software.

- Software documentation checklist — contains a list of the preferred types of documentation included in an acquired or developed software package.

- File creation checklist — indicates all of the steps that should be followed to ensure the integrity of a created file.

Technique 3. Create a pro-

fessional image for personal computer users. Many articles describe the inability of the personal computer user to do the job right. These attitudes were adopted years earlier to describe the inability of the user to define adequately requirements for application systems.

When these attitudes carry over into day-to-day relationships, it comes across as a superior/subordinate relationship. If personal computer users are looked down on

as second-class citizens or given other attributes of incompetence, it will be but another example of the centralized data processing group "attempting to run the organization."

The attitudinal change techniques are the following:

- Management support of the personal computer program — senior management and data processing management making known that the positive impact of these programs on the business can change attitudes.

- Evaluation of personal computer capabilities — recognizing what these computers can do creates an awareness of the power of the equipment.

- Cross-fertilization techniques — providing data processing personnel with personal computers to use for their own decision support processes can show them the uses of these machines.

Technique 4. Budgeting and accounting for time expended on personal computers by DP professionals. The expended time should be recorded by job function and by user. Each personal computer user should be assigned an account number (if there are many personal computers in one department, a user departmental number may be used).

The type of functions that need to be accounted for include hardware/software selection, counseling, implementing and/or debugging software and discovering problems. While it is not necessary to charge back this time to users, it is important to understand where the time is being expended so that the benefits from the use of those resources can be determined.

Technique 5. — Focus on a single information system technology. Data processing professionals must look at information processing as a single program within their organization. To consider personal computers one type of technology, office equipment another technology, centralized data processing another and so on, defeats any cohesiveness of direction. Once all information processing is viewed as a single technology, it can then be planned, managed and controlled.

Action 2

Programs and actions occur by and through people. The more effective the working relationship, the greater the probability that the program will be successful. A good working relationship implies a commonality of purpose that helps ensure the success of a program.

Working relationships are built slowly and on a base of mutual trust. The more effective the working relationship is between the data

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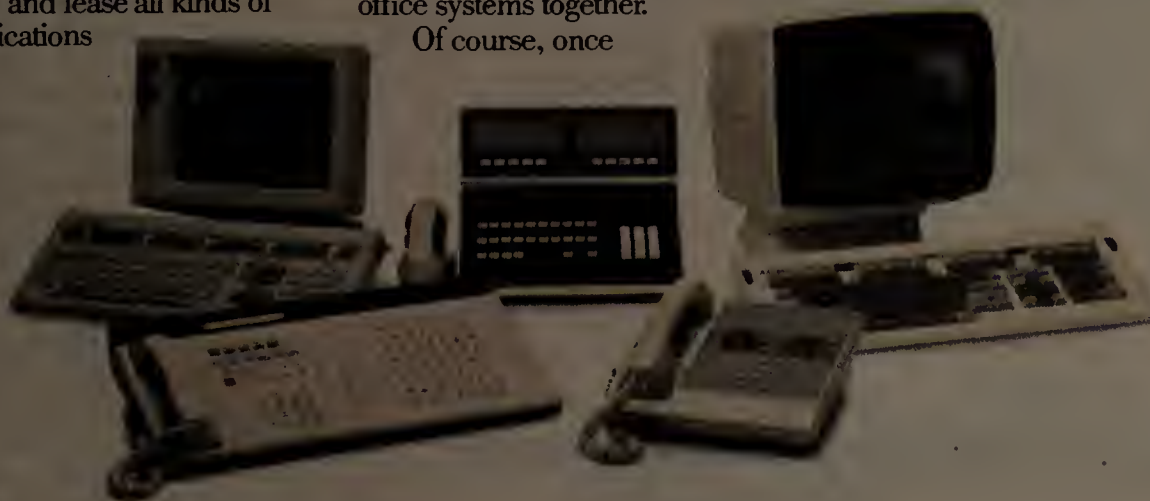
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processing group and its users, the easier it will be to build an effective personal computer relationship.

As with all other relationships, this is a two-way street. Both parties must want to develop the relationship. The catalyst for this desire to build a good working relationship can be the long-range information processing plan of the organization.

The following techniques can be used in building this centralized data processing-user relationship.

Technique 1. Provide the assistance requested. There is a tendency for data processing professionals to want to do what is needed, as opposed to what is asked. While the needed guidance may be given in good faith, it may not be welcome. It may be viewed as meddling and attempting to run the personal computer program in the same way the

central group runs the mainframe computers.

Individuals working with personal computer users, particularly in the early days, should be strongly cautioned to provide the type of advice and tools requested and to delay the introduction of good practices and standards until a solid working base between the groups has been developed.

Technique 2. Hold a personal computer open house. The kickoff for creating a good working relationship between the central function and the users can be important to building a good working foundation. An open house showing both the central function and the personal computer's capabilities is an effective way to kick off a new relationship. The open house can be during or after working hours or even on a

weekend. It should be widely promoted as an opportunity for those interested in personal computers to gather an understanding of how they work, observe and participate in demonstrations and meet the organization's experienced data processors in order to build a future working relationship.

Technique 3. Take a personal computer user to lunch. It is important to get to know personal computer users as people. This involves whatever methods work best for getting to know them. The open house is one technique — taking a personal computer user to lunch is another technique. Some data processing functions have set up personal computer tables in the company cafeteria and staffed them with data processing professionals. Those who want to learn about personal com-

puters can then have lunch with that individual and discuss how to get involved in personal computer processing.

In addition, data processing professionals could go out and visit the major areas of the company to discuss the organization's personal computer program and how it might be enhanced and improved.

Technique 4. Issue a personal computer newsletter. An in-house personal computer newsletter can promote what is going on in the organization with personal computers. The newsletter can indicate who recently acquired personal computers, what they are doing with them, programs that the organization is putting in place to help personal computer users, tips and techniques on using personal computers more effectively, new hardware and software announcements and so on. These do not have to be very formal or expensive, but they should collect information from and about the personal computer users in the organization.

The concept can be started by asking for a volunteer in the data processing department who has some literary talent and interest in the personal computer program.

Technique 5. Hold midday matinees. There are a lot of good programs and films on the personal computer. These are available from vendors, from video educational services and from computer stores. These programs can be video, film, slides or speakers. The programs should be put on at lunch in a common area in the organization. Announcements about the availability, the topics and when these programs will be given should be widely distributed.

Action 3

A major contribution that can be made by the data processing professional is improving the productivity of personal computer technology. From the user perspective, this may not be an overriding issue, but from the magnitude of the program and the potential performance improvement, it is a program that needs to be undertaken. The central data processing function, or a function established for personal computers such as an information center, is best equipped to fulfill this role.

The technological issues that need to be addressed include: hardware and software selection, standards, training programs, good programming practices and intercoupling of hardware.

Data processing professionals can use the following techniques to address the personal computer technological issues:

Technique 1. Create awareness of processing options. A user's first involvement with a personal computer may be his only involvement with computing. He may not recognize the options available to him personally and through his organization. For those reasons, work may be done on a personal computer that could best be done on a central computer or word processing equipment. In other instances, the incorrect software or hardware is selected for personal processing, when another significantly more effective capability is available.

Developing a program that identifies the options available and then creates an awareness among existing



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and potential personal computer users of those options can provide a very valuable service to the organization.

Technique 2. Develop the relationship on a business orientation. The personal computer was designed to assist users in fulfilling their day-to-day job responsibilities. In general, these users are unconcerned with the technology associated with accomplishing the job mission. The fact that the technology is not fully understood, may be used ineffectively or in many cases misused may be of little importance to the user. If some desired piece of business information can be obtained through using a personal computer, information that could not be readily obtained otherwise, the misuse of technology may seem relatively unimportant. The data processing professional must recognize this business orientation toward personal computers, as opposed to the technical orientation for which the professional is trained.

Technique 3. Learn the personal computer as a user. The understanding that is needed to gain technical proficiency must be learned by actually using the machines. Whatever personal computers are selected for the organization should be disseminated within the data processing function.

The individuals assigned to oversee the personal computer program should utilize those machines in the performance of their day-to-day functions. In conjunction with any personal productivity gains, there will be a technological comprehension of the intricacies of processing. This experience can then be used to develop more effective standards and practices for utilizing the equipment.

Technique 4. Develop personal computer practices. The data processing professional will develop a set of practices for use of the personal computer through experience. If several data processing professionals are using the equipment, the totality of knowledge of the group will produce better practices than any individual user. These practices should be codified and distributed to the users of personal computers in the organization. While the use of these practices is optional, many will welcome the opportunity to benefit from the experiences of another user with proven success.

Technique 5. Develop personal computer standards. The best practices should be incorporated into standards for the use of personal computers. If the standards are developed out of good practices, which in turn are developed by users, then the standards become the best of the practices. The development and use of standards is a prerequisite to control, which in turn is a prerequisite to placing full reliance on the results of personal computer processing.

Action 4

The objective of the first three actions is to establish an environment in which the long-range plan can be implemented. The preparatory action has created a plan and an atmosphere for implementation. The second action built a working relationship of mutual trust on which the plan could be built. The third action provided the necessary technical know-how to perform those tasks necessary to make the plan work. The final action relates to the

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The fact that the technology is not fully understood, may be used ineffectively or in many cases misused may be of little importance to the user.

actual implementation of the plan.

The personal computer plan requires the same type of support necessary to implement any type of plan. If there is a difference, it is in the magnitude of the plan and number of organizational units involved in accomplishing the plan's objectives. Because of this, senior management support and involvement are essential to the success of the plan.

The techniques that data process-

ing professionals can use to help implement the plan include the following:

Technique 1. Educate mainframe users about personal computers. The long-term success of information processing will be partially dependent upon the skill level of users. As data processing becomes more integrated into the day-to-day work of users, their knowledge of systems and systems architecture will assist in the effective use of those systems.

Experience has shown that the more users know about data processing, the greater the probability of successful use of that technology. The personal computer provides these users a first-hand experience of how applications are constructed, implemented, operated and controlled. The personal computer should be used as a positive learning experience for users. This requires some central direction, oversight and counseling.

Technique 2. Measure personal computer limits and prepare for alternate processing. The personal computer will not have the power or capacity of the large-scale computer. The types of tasks assigned the personal computer by first-time users will be well suited for those machines.

However, over time the data bases, processes and needs will

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expand as they do in any other automated system. Within time, the processing limitations of the personal computer will be reached. These limitations may be disk storage, file access mechanisms, operator time or ability, processing constraints of software or the need for data that is not readily available to the personal computer user.

At this point, personal computer users will need processing capacity not readily available. The type of capacity needed will be associated with central systems and/or central data bases. The central group should define and measure these limitations so that they can anticipate the point at which the personal computer user will need central processing assistance. This technique provides a timetable for establishing a personal computer communications network, providing access to centralized data bases and creation of personal computer workstations.

Technique 3. Promote personal computer standards. The key to a quality data processing environment is the establishment and use of standards. This lesson was learned years ago in the central computer sites. The lack of life-cycle methodologies, standard data definitions and so on significantly increased the cost of data processing and undermined the credibility of completing projects on time, within budget and in accordance with user specifications.

On the other hand, the introduction of standards is a later step in the maturity of any technology. The centralized data processing function

should be promoting the concepts early, and when acceptance is timely, be prepared to provide assistance in the development, implementation and training of users in personal computer standards. However, it is recommended that the standards be developed by the users and not by the centralized function.

Technique 4. Business systems planning. Business systems planning is a method of integrating MIS processing into the planning procedures of the organization. The objective is to focus high-level managerial attention on the priorities and problems of information systems. Many organizations currently do this with their centralized data processing. Those organizations need to integrate personal computers into their centralized information systems — business systems planning procedures. Those organizations currently not using business systems planning need to consider the development of committees made up of high-level executives to determine the priorities, directions and planning for using personal computers within the organization.

Technique 5. Checkpoint reviews. The quality of application systems has been significantly improved in

”

Many users install personal computers, but the abandonment rate is high. Only a few will make truly effective use of those computers without central direction.

the centralized area with checkpoint reviews. The objective is to conduct evaluations periodically throughout the development of an application to ensure that it is being properly implemented. The same concept should be used for the personal computer program in the organization. The program should be established as a long-range program with predetermined objectives and goals. Checkpoints can then be established throughout the implementation process.

Review groups

At these checkpoints, review groups should be formed. Review groups should be made up of the individuals having a vested interest in the success of the personal computer program — for example, users, executive management, auditors and centralized data processing management. The review groups should evaluate progress in implementing the personal computer program, challenge the long-range goals based on current business objectives and then provide assessments on the success and/or problems in implementing the personal computer program.

The concept of personal comput-

ers is to extend the capabilities of the computer to any individual in the organization needing that resource. Introducing the concept is easy. Personal computers are placed in the hands of those individuals needing them: Ensuring the effective, efficient and economical use of those personal computers is an organizational challenge.

Going from a reality to an implementation requires planning and then the implementation of those plans. Sustained action and direction are required. Many users install personal computers, but the abandonment rate is high, and only a few will make truly effective use of those computers without central direction.

Successful use of the personal computer should be based on the following three foundations:

■ **Personal computer planning** — well-developed plans that are fully supported by senior management need to be created.

■ **Action through centralized direction** — plans only become reality when a catalytic function ensures sustained action. This is best accomplished through centralized direction.

■ **Evaluation** — projects only work when there is good feedback regarding the results of the personal computer program. This necessitates the establishment of yardsticks by which to judge the success of the personal computer program, measuring performance against those yardsticks and making any necessary adjustments based on failure to achieve desired levels of performance.

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Special Report

Computerworld
June 24, 1985

Data Base Management Systems

Moving beyond relational software



Inside:

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Special Report

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Will data base machines replace

Independent units offer relief to resource

By John Gallant
CW Staff

Some years ago, mainframes were relieved of the complex, repetitive processing involved in terminal communications. Rather than bog the host system down, designers reasoned, it was more efficient to off-load communications tasks to a front-end processor, such as a terminal control unit.

Today, corporate data bases hungrily devour megabyte after megabyte of storage capacity, and more users and applications vie for access to the shared data resource, straining the data management capabilities of the mainframe. In addition, end users and DP professionals demand the increased productivity promised by relational data base management sys-

tions. The data base machine becomes the independent data server, tying together a variety of machines and applications.

"One of the first steps in computer architecture was to take communications and put it outboard," said William Inmon, a director at Coopers & Lybrand in Denver and a noted author on the topic of data bases. "At one time, we had a machine that did everything. But we realized it was very complex doing terminal communications, so we off-loaded all of that to a front-end processor. The data base machine is the equivalent concept for data base processing."

The concept is one that fledgling data base machine vendors are hoping users will embrace but one that analysts are uncertain users will. In

agreed. "I think it is a safe bet to say there are some people out there who are looking for interesting solutions like the data base machine. But the majority of users are looking for the cheapest, quickest solution they can find, and that generally means they are not looking for a data base machine."

But, said Scott Smith, vice-president of the Stamford, Conn.-based Gartner Group, Inc. market research firm, the success of data base machine vendor Britton-Lee, Inc. has caused him to reevaluate his earlier assessment of the technology's market potential.

"We do not have any hard numbers on the market, but I think it is in a nascent stage, and it could be a big one," Smith said. "The market has already done better than I expected."

To get a sense of direction, Smith and other analysts said the market must be considered on a vendor-by-vendor basis. Los Gatos, Calif.-based Britton-Lee and Los Angeles-based Teradata Corp. are the acknowledged market leaders. Indeed, the two companies are perhaps the only vendors to have shipped production models of their data base machines.

According to President David Britton, Britton-Lee currently has close to 500 data base machines installed in some 150 different user sites. The company offers several models of its Intelligent Database Machine, which is targeted primarily at minicomputer sites including Digital Equipment Corp.'s VAX line. Britton-Lee intends to widen its market with upcoming product introductions, including a microcomputer network data base server slated for July release.

Despite their leadership status, Britton-Lee and Teradata have not clashed. Teradata's DBC/1012 is aimed at the high-end IBM mainframe environment, an environment one market analyst said is extremely difficult to penetrate. The DBC/1012 features a parallel processor architecture that can be configured with between six and 1,024 processors. The full-blown configuration, according to David Clements, Teradata's director of marketing, boasts a storage capacity of one terabyte, a trillion bytes of data. To date, he said, the company has installed about a dozen machines.

”

'One thing unique to the data base machine is connectivity. All types of computers can talk on a common basis to that common data.'

— David L. Britton
Britton-Lee, Inc.



tems. But the relational systems exact a toll in processing power.

Enter the data base machine, a specialized combination of hardware and relational DBMS software dedicated to performing efficiently and rapidly data management functions once available only in sophisticated DBMS software.

Proponents of the data base machine concept argue that, as with terminal communications, it is only logical to shift resource-intensive DBMS tasks from the host to such a back-end processor. Relieved of the data manipulation work load, the host — which serves as gatekeeper to the data base machine — is able to accommodate more users and applica-

fact, the data base machine market is so young that most industry research firms do not maintain statistics on its size, nor do they make predictions as to its future growth. Indeed, individual analysts spar over current user interest in data base machines.

"Right now there is no significant user interest. [Data base machines] are just not being widely used," said Michael Geran, vice-president of research for the New York-based investment firm of E. F. Hutton & Co. "[Data base machines] look good in theory, but they are very application dependent. It is even too early to formulate any numbers because the market is so young."

Coopers & Lybrand's Inmon

Hardware to play major role in future of DBMS

The debate over whether the future — at least the near-term future — of data base management lies in software or hardware is far from over. Over the long term, analysts and users agreed, it is clear that hardware will be adapted to embody data management capabilities more efficiently. Whether the architectures of one of the current data base machines will ultimately prevail is less than certain, however.

"The data base machine is not an option we have considered. We see software carrying us out well into the future," said David James, data administrator with Riggs National Bank in Washington, D.C. He explained that the bank currently maintains some 150 separate data bases occupying 70 IBM 3380 disk drives under IBM's IMS

DBMS on a 3084 mainframe operating under MVS/XA.

James said the concept of a centralized data base with relational capabilities has its merits, but the organization of data presents an obstacle to implementing a data base machine. "You are talking about organizing a lot of data. If you could not do that with a [software] DBMS, you do not have the experience to use a data base machine."

"IMS was touted as the big advance in the past," he added. "But most users used IMS as nothing more than a glorified access method because they did not know how to prepare their environments for shared data management. People just do not know how to use a data base machine."

See FUTURE SR/23

software? demand

Clements said Teradata hopes to ship more than twice that many machines in its upcoming fiscal year, which begins July 1. A Britton-Lee spokesman would not reveal internal shipment projections but said the company expects 1985 revenue to be between \$36 and \$40 million, a growth of roughly 65% over 1984 revenue of nearly \$22 million.

The current target audience for both vendors' products seems to be a narrow group of users with massive raw data manipulation applications, such as seismic research and computer-aided design and manufacturing. But both Teradata and Britton-Lee are gambling that certain pressures facing all users will spur an increasing need for data base machines.

According to Britton, the most important of those pressures is the demand for relational data management capabilities.

Productivity, performance provided

"The relational data model is very powerful, and it provides a very concise way of talking to data," he said. "But it consumes a great deal of the overhead of a general-purpose computer. You are getting a 10:1 increase in productivity, but you are eating up 50% of the resources of the computer. With the data base machine, you get the productivity, but you also get the performance, which is relatively low cost because hardware is cheap these days."

Another vital asset, Britton said, is that the data base machine can serve as a black box connection between a variety of processors in a heterogeneous computer environment.

Teradata's Clements highlighted two other forces prompting users to consider data base machines. First, research indicates more than half of large IBM sites are multiple-mainframe shops. Software DBMS, according to Clements, are not designed to serve more than one processor efficiently, unlike the data base machine.

In addition, Clements claimed, users are spending more on storage subsystems than on computer power for the first time. Thus, the costs of data storage are driving large shops to the massive storage capabilities of the data base machine.

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'In the future, hardware will be radically different in its [data management] capabilities.'

— Ronald G. Ross
Data Base Newsletter

Ample growth seen for mini DBMS market

By Ann L. Morley
Special to CW#

The promise of data base technology has seduced industry professionals as the amount of information stored electronically has skyrocketed. To the great relief of users, data base management systems have undergone immense change since their commercial introduction in the 1960s.

Like most developments in the software industry, the evolution of DBMS has involved a process of absorbing advances in on-line programming, control and security, data relationships, program generation, screen mapping, end-user access tools and the like. Today, debates on the future of data base products hinge upon research conducted in distributing system resources and networking, high-level user-friendly languages, the improved performance of relational systems, hardwired approaches, content addressable memory, parallel processing and other areas.

Until now, DBMS technology has been embraced largely by users of mainframe computers for central administrative applications managing large data bases. According to International Data Corp. (IDC), a Framingham, Mass.-based market research firm, 90% of the U.S. installed base of 3084 machines are running at least one of the commercially available systems; moreover, almost 70% of the 4381 population has implemented at least one.

Markets for DBMS software have been contested hotly since the early 1970s when independent suppliers like Cincom Systems, Inc., Software AG and Cullinane Database Systems,

Inc. decided to tackle IBM on its own turf with products arguably superior to IBM's own. Notwithstanding the deep penetration made by these vendors into the IBM-compatible installed base, there is ample opportunity for them there for the next several years. However, there is movement afoot elsewhere:

■ Software House, Inc., of Cambridge, Mass., recently announced that their System 1032 DBMS fully supports Vaxcluster — everything from VAX 8600 clusters to the new Microvax II.

■ Information Builders, Inc., in New York, unveiled a DEC VAX version of Focus, its highly regarded fourth-generation DBMS-based language.

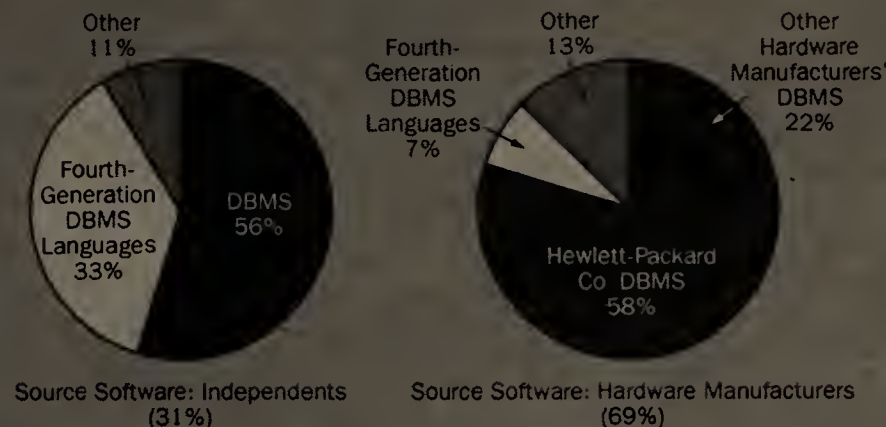
■ Hewlett-Packard Co., based in Palo Alto, Calif., has announced the availability of Turboimage, an enhancement of the firm's proprietary DBMS, for HP 3000 customers.

■ Relational Technology, Inc., located in Alameda, Calif., has announced a personal computer link for users of its DEC VAX Ingres data base system.

Moreover, DEC and Data General Corp. have both introduced relational data base management systems to shore up their positions among customers of their manufacturing and engineering products. Prime Computer, Inc. has introduced a popular fourth-generation DBMS-based language called Information, and Per-

See CHANGE SR/12

Type of data management software in use at selected U.S. superminicomputer sites, year-end 1984*



* Sample from 229 sites running data management software; 427 supermini sites in International Data Corp. sample.

Source: International Data Corp.

Symposium panel fields DBMS questions

By George Schussel
Special to CW#

A regular feature of the National Data Base and 4th Generation Language Symposium (DB + 4GL) is a panel discussion featuring six or seven representatives from leading software firms and independent consultants. Questions are submitted by the symposium audience. Some of the more interesting questions that have been submitted recently for discussion are presented here.

Q Will decisions to purchase applications software be affected by the improvement in productivity possible from the use of data base management systems and fourth-generation languages (DBMS) to generate custom systems?

Current DBMS/fourth-generation language techniques are going to have an important impact on the applications software business. The fact that less time is required to generate a custom application means that many more organizations can now develop their own applications. DBMS/fourth-generation language code reduces, by a factor of from five to 10, the lines that have to be written for an application compared with Cobol.

Another impact of fourth-generation techniques is the narrowing of the distinction between the previously separate markets for applications software and systems software. Major applications houses, like McCormack & Dodge Corp., Walker Interactive Products, Inc. and Management Science America, Inc. either have or will be an-

nouncing fourth-generation tools. At the same time, DBMS and productivity tool vendors, such as Cullinet Software, Inc. and Cincom Systems, Inc. are now selling applications software products.

Q How important is it to have the experience of a proficient data base practitioner when starting out using fourth-generation languages built on top of DBMS?

The idea of total applications development without programmers has been discredited in most organizations that have tried it. Certainly it is possible for business analysts or other nonprogramming personnel to build applications featuring reporting or decision support as long as these applications do not support large numbers of transactions or contain complex procedural logic. Such applications are an important part of the new computing environment, and they can be built without the experience of professional programmers or data base administrators.

Most medium or large organizations, however, have found they need complex transaction processing applications. Professional data base administration and programming skills are needed in these environments, even with relational DBMS and fourth-generation languages.

Q What are the differences between inverted-list data bases such as Computer Corp. of America's Model 204 and Software AG's Adabas and relational DBMS such as Oracle Corp.'s Oracle and Relational Technology, Inc.'s Ingres?

Both inverted and relational DBMS support data models consisting of flat, two-dimensional tables. In the inverted model the user sees not only the tables but also the indexes that have been built as a retrieval mechanism on

See PANEL SR/6

Schussel is president of Digital Consulting Associates, Inc. of Andover, Mass., and chairman of the National Data Base and Fourth-Generation Language Symposium.

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Special Report

PANEL from SR/3

top of those tables. Many questions in the inverted environment can be answered by working with the indexes without accessing the data base at all. For example, the question of how many records meet criteria A and B but not C can be answered just from the indexes if indexes exist on the selection criteria.

In the relational model, all of the operators are set oriented. A single relational operator such as a SELECT will produce a set of records, which may consist of as few as zero or one record.

In inverted DBMS, the basic data manipulation language is usually record oriented, and set-oriented processes are handled through a query language.

Q What can be done about the performance problems of fourth-generation languages and relational DBMS?

In a broad sense, there are two different types of DBMS/fourth-generation language combinations:

■ Relational DBMS and user-oriented fourth-generation languages such as D&B Computer, Inc.'s Nomad2; Information Builders, Inc.'s Focus; and Ramis II, developed by Mathematica Products Group, Inc., are frequently single threaded with English-like user languages.

■ Other DBMS/fourth-generation language combinations, such as Cullinet Software, Inc.'s IDMS/R and ADS/O, Software AG's Adabas and Natural and Cincom Systems, Inc.'s TIS and Mantis have more programmer-oriented fourth-generation lan-

guages and more of a performance orientation, with multithreading access for building transaction processing systems.

This latter category of products does a better job of solving performance-oriented applications needs but is typically not available to end users. Since relational DBMS and fourth-generation languages are relatively new, such products are still early in their development. It is reasonable to expect enhancements of these products. Today, however, Cobol code with a structured low-level DBMS is going to offer more performance potential than higher level, easier to use software.

Q Several vendors describe their DBMS as relational when in reality they are hierarchical with cer-

tain user-friendly attributes or extensions. Do you have any comments?

The battle lines are drawn, and there is sharp disagreement on this issue. The relational pundits, led by Edgar Codd, the originator of relational DBMS theory, argue that "born-again" implementations such as IDMS/R, Datacom DB and TIS are not truly relational and are inferior. This group's arguments include the following:

■ Sophisticated optimization techniques require detailed statistical analysis of a data base. Such components may be missing from the relational processing mode in a "born-again" system. As a result, performance-oriented applications require lower level, older approaches.

■ "Born-again" systems provide a JOIN operator, which is less functional than true relational systems. Examples differ by product, but tables may not be joinable to themselves, or support may only exist for an EQUIJOIN, or the JOIN function may be only implementable through a looping verb.

■ In a relational data language, the ability to create new views of data should be unlimited. "Born-again" systems with CREATEVIEW verbs are typically restricted in capability or available only to the data base administrator.

The vendors of the "born-again" relational systems argue that many of these points are of academic interest only. Their arguments take the tack that, in addition to supporting relational-like tabular views and verbs, their systems allow lower level, record-oriented processing. As a result of the performance potential of these lower level, less friendly processing modes, a system from a vendor like Cullinet or Cincom can be used for both information center and production center applications.

The proponents of these views argue that, if the user acquires a true relational system, such as IBM's DB2 or Digital Equipment Corp.'s RDB, then the vendor will sell the user two different data base systems, a hierarchical or network system (IMS for IBM and DBMS-32 for DEC) and a relational system for information center applications.

Q Within the next five years, will fourth-generation languages be significantly enhanced by artificial intelligence?

AI languages are starting to generate quite a bit of interest from DBMS users. The vendors of these tools now provide interfaces to a number of DBMS including Ramis II, DB2, IMS and Vsam.

There is a moderate amount of work in generating an AI language environment before it can be used. The lexicon, or data dictionary, of the product must be built. Such an effort has to be weighed against using fourth-generation languages for comparable queries. Fourth-generation languages seem to require more end-user training but currently have the potential for being implemented more quickly than AI languages. Fourth-generation languages can also have broader functionality.

The National Data Base and Fourth-Generation Language Symposium is scheduled for three upcoming cities and dates: Dallas — November 5-8; Boston — December 3-6; Sydney, Australia — February 24-27, 1986.

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Machine helps cigarette maker manage lab data

Coordinates collection of test information, serves as gatekeeper to mass storage devices

RICHMOND, Va. — At a laboratory here where thousands of cigarettes get smoked, weighed and otherwise analyzed each year, a data base machine helps researchers manage the millions of data manipulations that accompany their work.

Scientists at the Philip Morris Research Center test samples of Marlboro, Merit and other brands produced by Philip Morris USA, the nation's leader in cigarette sales. To keep tabs on competitors' brands, the center analyzes these too. Cigarette sales in the U.S. totaled \$16 billion in 1983, with Philip Morris capturing more than one-third of the market.

In the lab, researchers check nicotine levels, tar values, paper porosity and other factors that will help the company find the best method of treating and curing tobacco and the ideal formula for blending different tobaccos to get a desired flavor. Hundreds of machines from a number of vendors — intelligent laboratory instruments, micros, CRT terminals, a minicomputer and a mainframe — capture and transmit information from the tests. The machines are linked on a network that Philip Morris calls its Laboratory Automation System (LAS).

In 1984, the research work at Philip

Morris accounted for 1.6 million data manipulations. The firm defines a manipulation as any point at which data surfaces, either for transmission from one piece of equipment to the next or for review by a scientist or other worker. It does not release other measures of research activity.

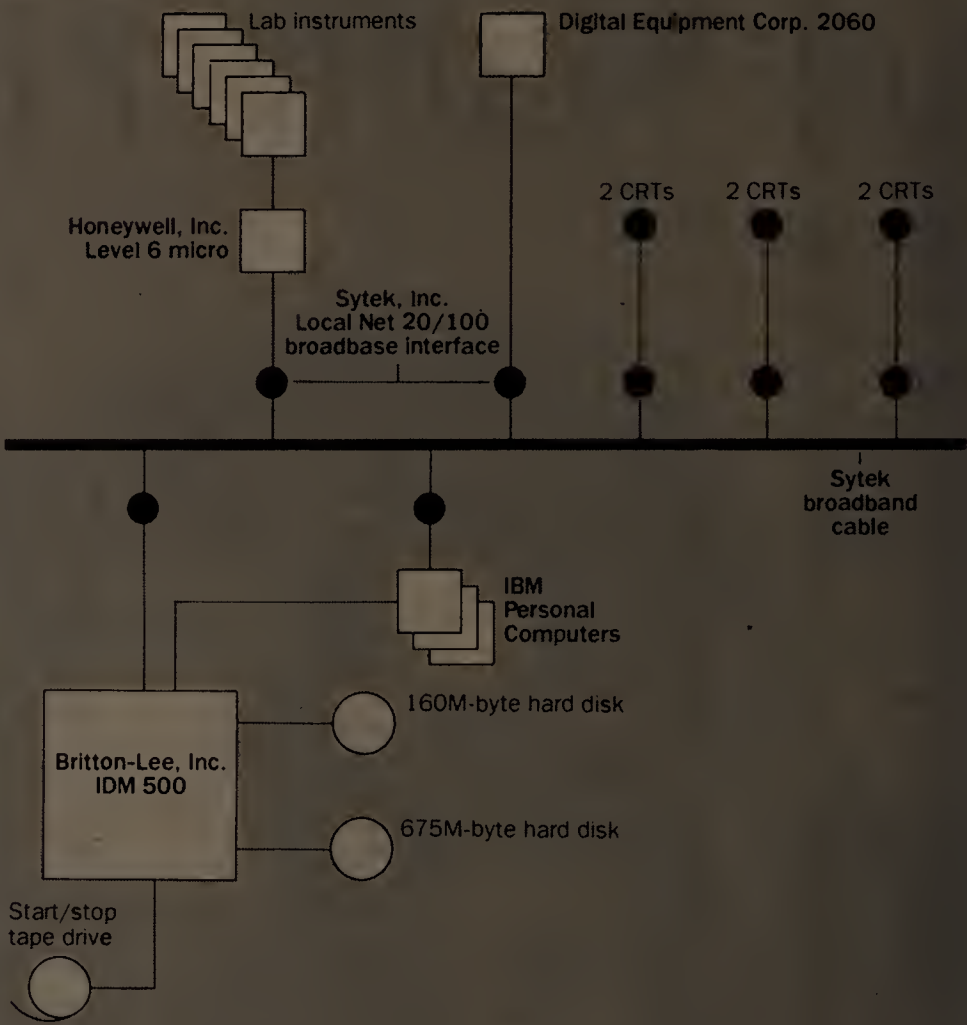
A Britton-Lee, Inc. Intelligent Database Machine (IDM) 500 coordinates data storage and exchange among machines. The IDM serves as a gatekeeper between the laboratory's machines and its stored data, which resides in two Control Data Corp. hard disk drives — one with 160M bytes of storage and the other with 675M bytes.

Philip Morris brought up the IDM in 1983 as part of its solution to a large data coordination problem. The lab's computer applications division, a data management group that produces reports and provides other DP support for many of the center's 500 scientists, technicians, applications personnel and managers, had trouble tying together data gathered during researchers' numerous analyses.

Computer printouts, hand-written notes and other forms of information arrived at the applications division after a cycle of reviews and compila-

See CIGARETTE SR/9

Philip Morris USA Laboratory Automation System hardware



Source: Philip Morris USA

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Special Report

CIGARETTE from SR/8

tions in the lab. Some of the information came in on printouts generated by the laboratory instruments. Some was on paper — scientists in the lab had jotted down data that had been displayed on lab instruments' CRT screens. Other reports were compilations; they had been drawn together by senior scientists and generated on the firm's host computer, a Scientific Data Systems, Inc. Sigma IX.

In the applications division, workers collated the information and passed it on to top scientists, who identified key data. Employees entered this data into the Sigma IX, and the applications division staff generated reports.

The cycle entailed about seven transfers of information from one piece of paper to another, according to Lucy Waller, the center's data administrator. At each transfer, people could misread data or make mistakes copying it. In addition, the process contained some duplication of effort: Some of the data entered into the Sigma IX at the end of the cycle had been generated earlier.

'I was somewhere up the creek'

"I felt, quite frankly, that I was somewhere up the creek," Waller said. "I needed the ability to pull this data together. . . . The data was coming in from different laboratories and different instruments. And yet the data had a common denominator of having come from the same sample — the same pack of cigarettes."

Waller began looking for a solution; at the same time, she had to find a replacement for the Sigma IX, for which support had been discontinued. The center bought a Digital Equipment Corp. System 2060 as its host; it then brought in the IDM to manage data base functions for the LAS, which would have overburdened the 2060. After a number of upgrades, the 2060 currently has 8M bytes of memory; besides supporting the LAS, it runs other business applications.

According to Waller, the data base machine approach had some potential pitfalls: The technology was new, it would represent a major change from the center's old operations, and Britton-Lee had not yet established a completely solid standing. "It was considered by us to be very high risk," she said. But the center's management, a group oriented toward research, decided to take the chance.

The center tied its lab instruments and data processing machines into the IDM with a Sytek, Inc. broadband cable. Software on each processor calls subroutines in the IDM's data base software, Britton-Lee's SQL-based Intelligent Database Language (IDL). The subroutines transform data from the different machines to a common format. Most of the machines use Fortran programs to call the IDM subroutines, but IBM Personal Computers on the network use Freeform, a software package from Dimension/IDM Partnership Ltd.

With the network and the data base machine, the center has solved its problems of duplications and manual information transfers. Information follows a pipeline from the original data collection machine to the data base. At the data base, it is accessible to anyone along the line.

Waller said analyses on cigarette samples still take about as long as

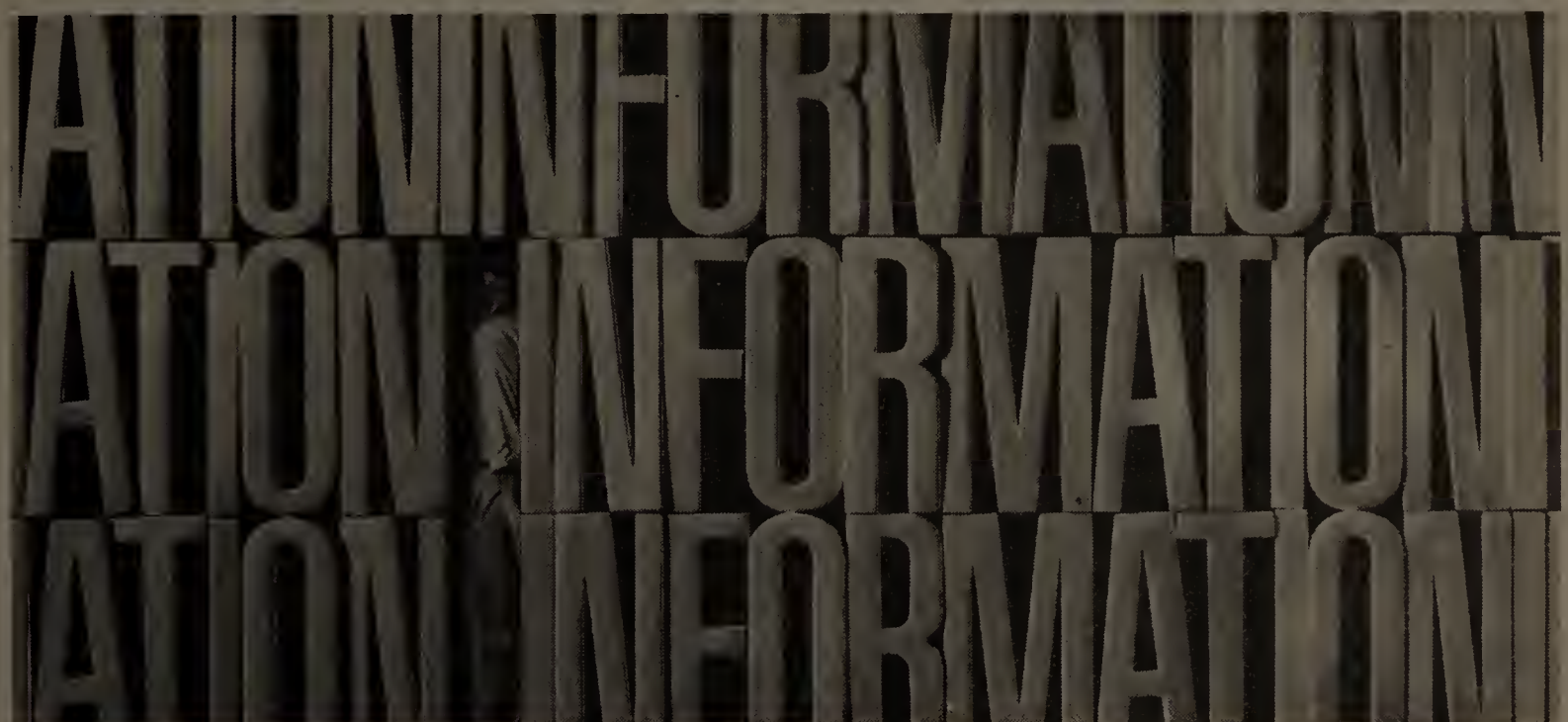
they did with the old setup — an average of two weeks. But they are more detailed because scientists can spend more time interpreting data and less time transcribing it.

"We've reduced the number of people performing the tasks, and we're doing things we've never done before, especially in the reporting area," she said. "We're able to prepare views of data that previously just weren't done. We're able to add more statistical perspective."

The IDM's data base language has also helped the firm. Waller said that although IDL falls short of being a fourth-generation language, it does have some tools that help programmers develop applications. Development jobs that would have taken her staff about 2½ years to complete now take about nine months, she said.



Philip Morris chemist analyzes samples. Research work at the cigarette manufacturer accounted for 1.6 million data manipulations in 1984.



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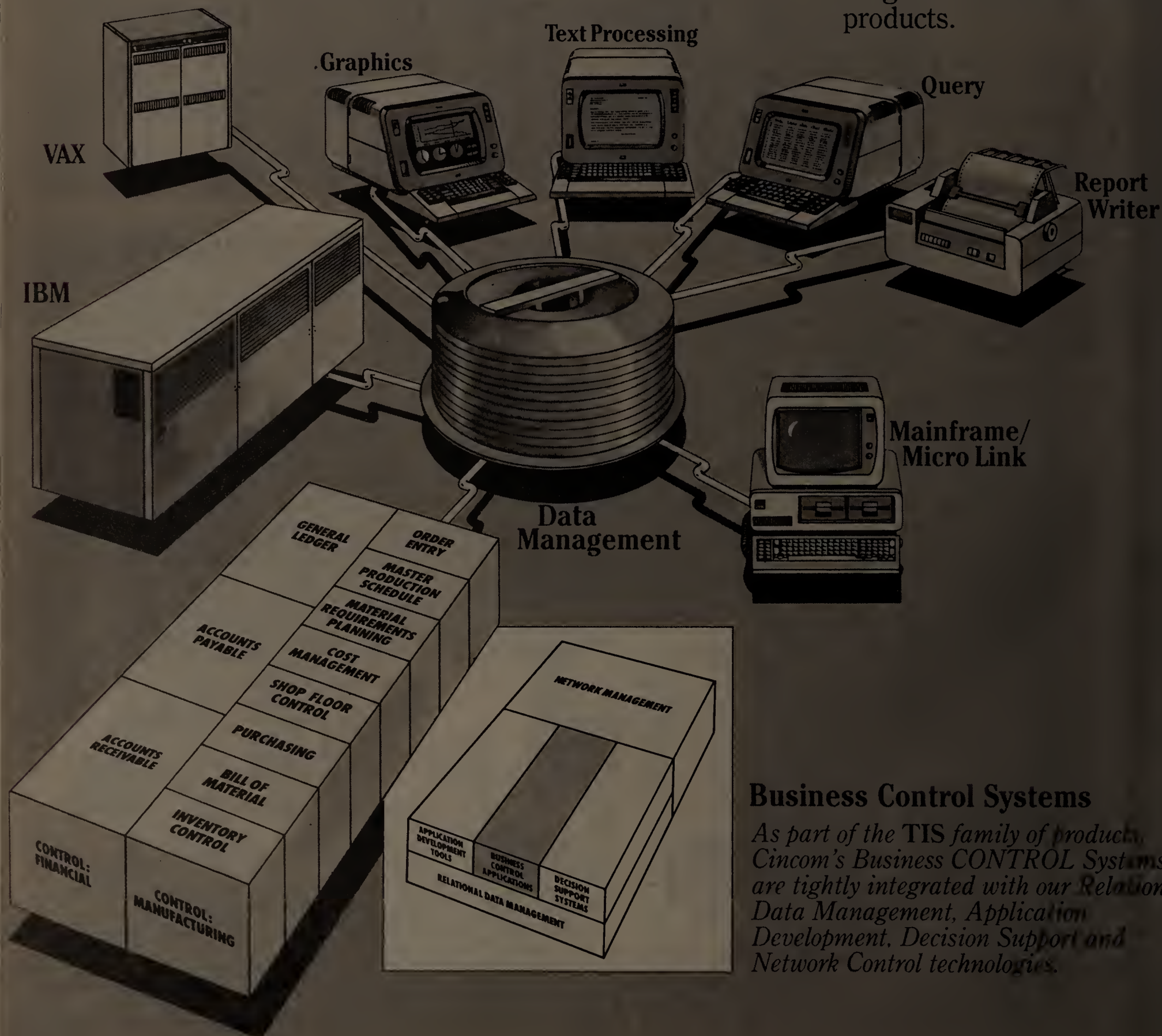
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Special Report

CHANGE from SR/3

kin-Elmer Corp. and Tandem Computers, Inc. have continued to invest in and enhance their own proprietary systems.

Vendors — to date, DG, DEC, Wang Laboratories, Inc. and HP — looking to give their customers a tie-in to Big Blue have taken a hike to Westwood, Mass. and talked to Culinet Software, Inc. about links to the Information Center Management System.

The independents are typically writing code for the machines that sell best. Hence, there are a number of familiar powerhouses looking to DEC's commercial installed base to pad the bottom line.

Cincom Systems, Inc. and Software AG of Reston, Va., contenders

in the IBM mainframe sweepstakes, have joined the ranks of Relational Technology, Oracle Corp. based in Menlo Park, Calif., Software House and Britton-Lee of Los Gatos, Calif., each of which has staked out territory there.

Henco Software, Inc. of Waltham, Mass., has done well selling to the Prime installed base, although it is still licking wounds inflicted in Honeywell, Inc.'s ballpark.

Supermini market opens up

The market for data base technology is finally opening up among the installed base of superminicomputer users.

IDC has long predicted that this would happen in the middle of the decade and that it would offer both the independent software vendor and

the hardware manufacturer significant new opportunities.

There are a number of reasons for all of this frantic activity happening now:

■ Supermini users are beginning to support larger and larger data bases with the advent of more powerful machines like DG's MV/10000 and DEC's VAX 8600.

■ Advances in data base technology, particularly the commercial introduction of viable relational DBMS, have paved the way for users to embrace the technology without a tremendous — although still significant — increase in overhead costs.

■ The distribution of computing resources coincident with the introduction of new tools for end-user access and applications development are inspiring new organizational re-

sponse to data management.

And the evidence is overwhelming; despite all the headlines, Ethernet, Systems Network Architecture (SNA) and AT&T's Unix are not key user concerns.

When asked to rate the importance of an assortment of hardware and software products to the supermini environment in which they operated, respondents to a recent IDC survey revealed their priorities in the following descending order:

- DBMS
- Real-time operating systems
- Floating-point performance
- Third-party software
- Multiprocessor configurations
- Support of standard buses
- Fourth-generation languages
- Integrated office software
- Third-party peripherals
- Ethernet, SNA and Unix.

Considering the overwhelming number of respondents — some 34% of the IDC sample who indicated that data base management was most critical to their operating environment — there were not many supporting a DBMS. Approximately 50% of them did indicate that they were running a data management tool of one kind or another, but only 70% of this sampled group had actually installed a DBMS.

Overall, only 36% of the sites sampled by IDC had installed a DBMS by year-end 1984.

This percentage is deceptively high because HP bundles Image, its DBMS entry, as part of the fundamental operating software offered to its clientel. If the Image sites are removed from the count, the number of sites running DBMS software last year plunges to a mere 16% of the entire supermini sample.

System supplier looked to for software

Supermini users typically buy their data management software from their hardware manufacturer. IDC data indicates that about 70% of them, in fact, looked to their system supplier for programming support.

The independent software houses have not made the kind of impact among these users that they have in IBM-compatible markets largely because they are small — but fast growing — and because minicomputer users are accustomed to investing in bundled system solutions.

As most everyone is aware, IBM has lost market share to the independents in the DBMS marketplace; at year-end 1984, IDC estimated that they had installed just about half of the DBMS software licenses for mainframe computers.

Because it is a marketplace far from maturity, IDC expects the DBMS marketplace for minicomputers to grow at much healthier rates than its mainframe counterpart. Users will spend approximately \$150 million in 1985, which represents growth of some 35% to 40% over total spending last year.

Packaged software sales to superminicomputer sites are not just a matter of rumor anymore. Software houses nationwide are taking a second look.

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Morley is editor of "Software Watch," a newsletter on software industry issues and trends that is published monthly by International Data Corp., a market research firm based in Framingham, Mass.

Special Report

Switch to in-house data base musters interest in DSS

NEW YORK — When the publisher of a 19,000-page industry directory needed a way to analyze its massive data base — a repository for information about 127,000 manufacturers and their 50,000 different products — it switched from a service bureau to an in-house data base system.

Thomas Publishing Co. here, publisher of the annual "Thomas Directory of American Manufacturers," made the move last year after it recognized its need for on-demand decision support system (DSS) services and the service bureau's inability to provide them.

"The [bureau's] system was fine for updating and storing information," according to Al Klein, Thomas' special projects consultant. "But essentially it was a canned operation. Every time we needed to manipulate the data differently, it was a huge undertaking."

The firm had kept its data on a Data General Corp. mini-computer in the service bureau's data center. Whenever Thomas needed an ad hoc report, it had to arrange for the service bureau to format the report, schedule time on an IBM 4300 mainframe, dump data from the mini, load it onto the mainframe and run the program.

Weeks or months would pass before the entire process, including proposal preparation and other administrative tasks at the publishing house, was complete. "Sometimes it would never get done; people just wouldn't bother to ask for the information because it wasn't worth the trouble," Klein said.

He decided the key to generating enthusiasm for decision support was to bring up an in-house system that allowed users to do their own work. Under Klein's direction, the firm installed a 6M-byte Digital Equipment Corp. VAX-11/750 and Oracle Corp.'s Oracle data base management system, a relational DBMS based on SQL. The company's directory data takes up about 350M bytes of storage on one 470M-byte Fujitsu Ltd. Eagle disk drive.

Users enter and retrieve information with Televideo Systems, Inc. 970 and Lear-Siegler, Inc. ADM 2A terminals, with IBM Personal Computers and through terminals on a multiuser Dynabyte, Inc. Monarch microcomputer. The Monarch is hard-wired to the VAX, and the other machines have dial-up access.

For Thomas' first data base project, an application for the firm's editorial department, Klein set up a series of 12 tables: seven for

different categories of information about companies listed in the directory and five for product headings. The largest table, one that lists companies' product offerings (ranging from "abacus" to "zirconium"), is 1.1 million rows long.

When users want to do ad hoc DSS reporting, they can

implement SQL to access, search and join tables. If they want to find out, for example, the names and directory product headings for all the products a manufacturer makes, they can join a table that contains company



names with the product table and the heading tables.

Klein said users can learn the basics of SQL and generate reports without much training, an important consideration in getting people to use DSS tools. "Most people are not interested in becoming computer experts," he said. "They want to put a

little energy into learning and then get a lot out of it. With SQL, they can start out with just a few commands and get results."

Users' early data base queries usually generate information too broad to be of much use, he said, but the positive reinforcement peo-

See THOMAS SR/33

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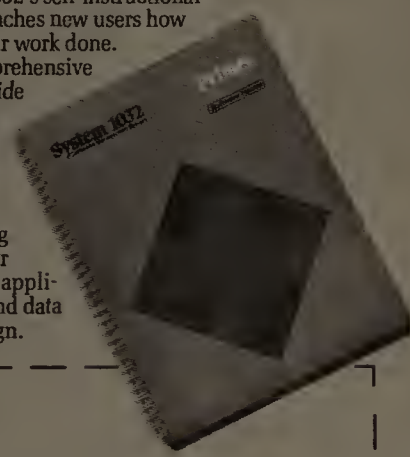
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Normalization facilitates data design process

By Robert M. Curtice
Special to CW+

Although many organizations are applying data management in an effective and modern manner, there still seems to be a lag between advanced ideas and actual practice in the area of data design.

One topic in current data design practice that remains somewhat misunderstood by the average user is normalization.

Normalization is the foremost buzzword in modern data design methodologies. Any data base designer of merit knows the three basic normal forms by heart, and the topic has been the subject of countless master's degree and doctoral dissertations that explore the world of fourth and fifth normal forms and beyond.

Although the definition of normal forms began with Edgar Codd's relational data base concepts, many people have commented, and rightly so, that the fundamental principles have been applied by good designers ever since computerized files became a subject of study. The principles of normalization are sound and apply to nonrelational structures just as they do to relational data bases.

There are two points that should be addressed with respect to normalization: one deals with how it is achieved, and the other deals with the first normal form in particular. Many methodologies introduce normalization as a separate process. That

is, some sort of unnormalized design is derived, and then this design is normalized. A preferable approach is to include the considerations for normalization in the basic design process itself, so that a separate step is not required. In other words, normalized data structures should be designed from the start.

Both second and third normal forms depend on the concept of functional dependency — the dependency of the value of one data element (column of a relation) on another data element. To ascertain functional dependency, the criteria by which the value of an element of data varies — for example, what it depends on must be determined. Thus at any point in time, a license plate number will vary by vehicle and not, for example, by the owner or operator. A different operator does not imply a different plate number. But a different vehicle does. So a good data structure will have the license plate number closely related and dependent on the vehicle; it is not a property or function of the operator.

Notice that we make these decisions by examining the real world. We observe the way the world works: A car has a license plate attached; different drivers come and go, but the plate stays. It is not difficult to imagine a world where the operator takes the plate with him and attaches it to each vehicle he operates. The functional dependencies are different, and the data structure must be too.

From the above scenario, it is difficult to see why normalization is routinely carried out as a separate step after an initial design has been formulated. Getting the functional dependencies right is fundamental to the process; it is not an adjunct process.

In addition, the answers to the questions that determine functional dependency are empirical — they come from observations about the real world or discussions with users. Bill Ken, a member of

IBM's Data Base Research Center in San Jose, Calif., suggested that bad data designs can be normalized into bad normalized data designs. He said he prefers to design for normalized structures directly.

Peter Chen of the Graduate School of Management at the University of Louisiana, whose Entity-Relationship Model has proven popular in some circles, described normalization as "following the top-down Entity-Relationship Model approach. . . . You can get there quicker and easier than is possible through normalization."

It is a disservice to the important concepts behind normalization to regard it as a separable pro-

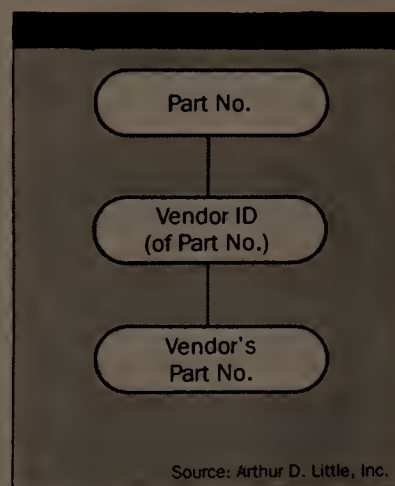


Figure 2.

Key		
Part No.	Vendor ID	Vendor's Part No.
100	Acme	X3-1
100	Beta	4982

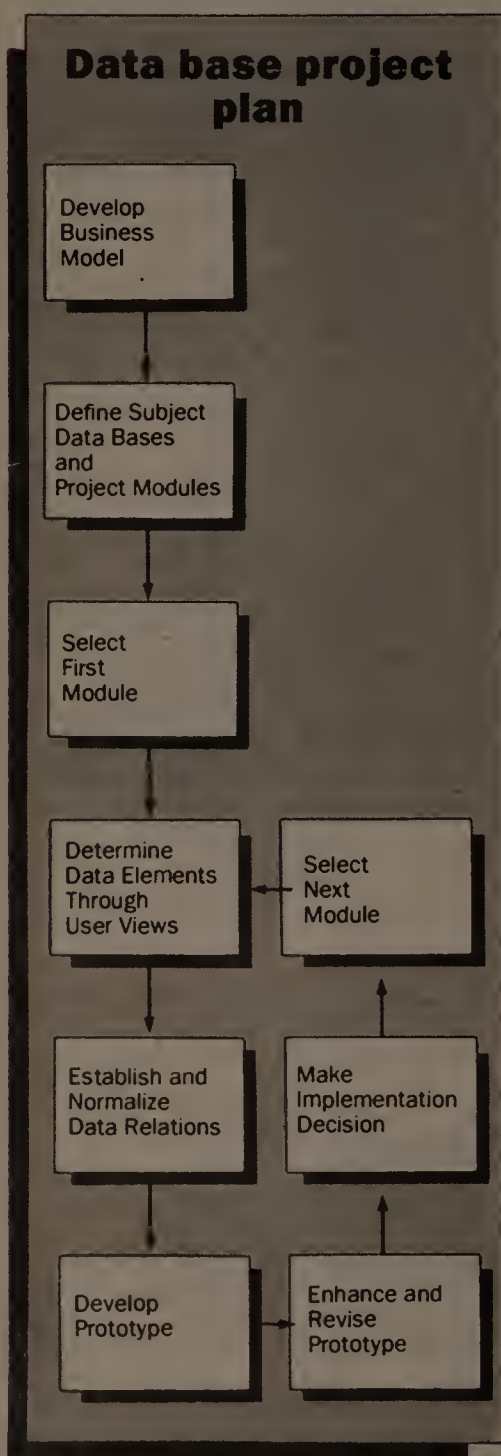
Source: Arthur D. Little, Inc.

Figure 1.

Key		
Part No.	Vendor ID	Vendor's Part No.
100	Acme	X3-1
100	Beta	4932
101	Acme	Y7-9
101	Beta	5516
107	Acme	X7-4

Source: Arthur D. Little, Inc.

Figure 3.



Clear goals pave road to central data base

By James Huling
Special to CW+

Many organizations that intend to convert a patchwork of applications-based systems to a corporate data base begin without fully defining either the destination or the road to get there. Most of them never arrive.

Instead, they wander for months or years in a maze of minor projects, hoping to somehow tie them together at the end. The result is a collection of applications systems that makes use of data base technology but ignores data base concepts.

The first step toward successfully implementing a corporate data base is to define the destination. Organizations should strive to put together a single pool of information, out of which different individuals can use different combinations of data elements. The data base system that provides the combinations may relate to applications, but the information resource must be viewed as an all-encompassing, nonredundant entity.

This concept forces the resolution of inconsistent definitions and the relinquishing of redundant data luxuries. The data element "department," for example, can no longer have one meaning for payroll purposes and another for general ledger.

Whether the data base is physically implemented as a single entity or as several is not important; it is important to break the rigid concept of applications-defined data and replace it with a concept that views all information as supporting the business functions that constitute the organization.

Once an organization defines its exact destination and its managers agree on it, a project leader can construct a plan to get there. The successful route will include the following important landmarks:

Development of a business model. A business model is a graphic representation of the major areas of a business and the functions within those areas. Definition of

these functions is essential, as is agreement on the definitions.

Through interviews with management, the project leader and project team members should first identify major business areas — management, production, sales and the like — then isolate the various functions within each area. Budgeting, personnel and acquisitions, for example, are usually functions of the management area.

Each of these functions uses information centered around various entities — employees, plants and so on. The project team should identify the entities then combine them into logical groups, or subject data bases.

The cross section of business functions and subject data bases forms the basis of the corporate data base. The project team can document the relationship between the business functions and the subject data bases by placing the functions horizontally by area across a page then listing the subject data bases vertically, down the left or right margin. To indicate the use of each subject data base by a particular business function, team members should make a mark in the appropriate row and column.

This seemingly academic exercise can have surprising results. Top-level managers may have completely different views of their areas and of the entire business. The graphic model facilitates resolution of these differences and will provide, in the end, the business context needed for the project team's in-depth data analysis.

Identification of data base modules. Through the business model, the project leader can determine the logical boundaries of the business function — subject data base relationships. These boundaries indicate the individual modules that will make up the data base.

A module may contain an application, such as payroll or accounts payable, or it may contain only a portion of an application. In either case, these modules will be the individual projects, whose successive development will lead to the completed data base.

The module containing the core data (the information that is needed by the greatest number of other modules) should be developed first.

Modular development. The development of a data

See MODULE SR/26

Huling is a systems analyst and project leader at Vulcan Materials Co., a Birmingham, Ala.-based chemical and materials company.

Special Report

cess. (Some data design ads claim to automate the normalization process. Perhaps they operate on a different concept of normalization.) The foundation of normalization — functional dependency — should be used to design normalized data structures directly.

The rule for the first normal form states that each cell in a relational table must be an atomic data value — in particular, repeating groups or structures is not permitted. Observe that this rule is quite different from those covering second and third normal forms that involve functional dependency. The rule for first normal form is structural, not empirical. What, then, is the basis for disallowing substructures

tween these two descriptions of data are miniscule at most.

Consider the relationship in Figure 1.

We know from the formulation of relational tables that there is a functional dependency between the vendor's part number and the part number plus vendor ID. Quite independent of the relationship between the vendor's part number and the key is another relationship between vendor ID and part

number. In fact, there is a multivalued dependency. This dependency would like to argue that we have substructures of a kind within relationships; that we are, in reality, dealing with at least a hierarchy (Figure 2).

In other words, the above relational table implies a hierarchical relationship: Each part number can be associated with more than one vendor ID (a one-to-many relationship). But this implica-

tion is hidden in the table. Thus, for example, there is no way to actually specify that the relationship is many-to-many, as would be the case if the Figure 3 relationship were encountered.

With first normal form restrictions, the substructures within a relation must remain hidden. Again, we are dealing with form and not substance in first normal form. This form is a simplification that is fine in some

cases but not helpful in others. It really does not add to the understanding of good data design. Yet, many people think normalization is equivalent to having no repeating groups in their records.

Curtice is manager of data management consulting at Arthur D. Little, Inc., a management consulting firm in Cambridge, Mass.

”

The principles of normalization are sound and apply to nonrelational structures just as they do to relational data bases.

within relational tables?

The answer has to do with the fact that relational algebra does not provide for concepts such as relations that are composed of other relations. Other theories and their associated mathematical apparatuses do. The point is this: The ideas behind second and third normal forms are not tied to relational data structure — they apply to any approach. But the idea behind first normal form is only meaningful in a strictly relational system that adheres to relational algebra.

There is nothing wrong with repeating groups. Consider this example: For each account, a manager wishes to record the balance in the account at the end of each month for a period of one year. He could establish 12 distinct elements of data, such as January account balance, February account balance and so on. Clearly such an approach satisfies all three normal forms:

- Each element is atomic.
- Each element is functionally dependent on the key: the account number, for example.
- No nonkey element is dependent on any other nonkey element; February's balance is unrelated to January's.

But what if, instead, the 12 elements are established as follows: Account balance occurs 12 times.

This is merely shorthand for naming the 12 entries in each cell rather than forcing a separate element name in each cell. The differences be-



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Kevin Kenny is President of J.J. Kenny Co., Inc., the municipal bond industry's largest "broker's broker." Trading through a network of 750 satellite-linked terminals, Kenny has cataloged a descriptive database (MUNIBASE) for an incredible 1.5 million issues.

The operation depends on powerful Perkin-Elmer 3250 superminicomputers, performing multi-processing tasks, over 2,000 real-time transactions per day (up to \$200 million), plus batch processing of updated issues overnight.

As J.J. Kenny has grown, the system has grown with it. To Mr. Kenny that's meant solid investment protection. "Though our database has expanded considerably, we've never had to change the basic software."



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CARL BRUNETT

As Technical Director of Picker International, Carl Brunnett has primary design responsibility for Picker's Computed Tomography (CT)—or "Cat Scan"—systems. For the past 10 years, he has depended on Perkin-Elmer computers.

The Picker CT Scanner converts 2 million data points into a high resolution image in just 12 to 22 seconds. With leading-edge throughput and image quality, Picker systems utilize their 32-bit processor's exceptional data handling capabilities through incredibly sophisticated software.

"Upward compatibility has enabled us to improve performance," Mr. Brunnett added, "without having to change the computer. The Perkin-Elmer has more than enough power for expandability."

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Special Report

Evaluation process yields standard system for retail chain

NASHVILLE — After a retail chain based here evaluated more than 200 microcomputer data base management systems during a search for a standard package, it learned that its two main requirements — flexibility and ease of use — were almost mutually exclusive.

"We needed a system flex-

ible enough to accommodate multiple corporate applications at the single-user level," said Richard Taylor, a senior MIS staff analyst at Service Merchandise, Inc. "And it had to be user-friendly because many of the DBMS users

also would be first-time users."

Service Merchandise, which operates a chain of 280 catalog showroom outlets,

made trade-offs between the two criteria when it chose DBMS software for more than 100 micros. In its final

choice, the firm sacrificed some desired simplicity to get the capabilities it needed, he said.

Taylor organized a three-month evaluation of DBMS software that began last July. Service Merchandise wanted a package that could support stand-alone applications on more than 100 IBM

Personal Computer XT's at its corporate headquarters and other administrative offices. The firm was evaluating mainframe packages at the time but needed a micro DBMS to handle immediate user needs.

Users wanted to perform a variety of functions, including personnel management, finance, records management, loss prevention and internal auditing. Their jobs, and the job of the two-person information staff that trains Service Merchandise's end users, would be made easier if the firm standardized around one DBMS, Taylor said.

”

'Had we simply gone out and purchased the most popular package or purchased the one that looked the best... we would have made a half-million dollar mistake.'

— Richard Taylor
Service Merchandise, Inc.

Specifically, standardization would provide three benefits:

- It would streamline user training, easing the burden on the small information center staff.

- It would give all users the same software so that people who switched from one department to the other would not have to learn to use different programs.

- A standard DBMS would ensure data interchangeability, which would help the firm with a future goal: the implementation of a standard link between the Personal Computer XT's and the firm's mainframes. Service Merchandise runs an IBM 4381 and two Honeywell, Inc. machines, a DPS 88/82 and a dual-processor DPS 8/70. The firm is installing an IBM 3083 next month.

Taylor set up a detailed list of criteria (see chart SR/33) and matched potential packages against it. After he eliminated software that lacked the features the firm needed, he ran benchmark tests on the packages that remained. During the benchmarks, he checked whether the different DBMS could operate under the Personal Computer XT's 256K-byte memory and whether they provided adequate response times.

With the evaluation procedure, the firm aimed to meet
See **SEARCH** SR/33



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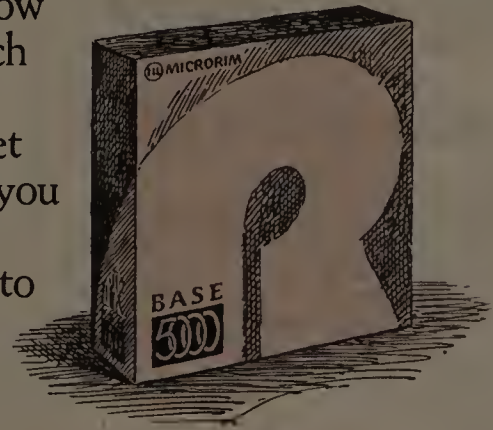
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Special Report

Data base development project explores China's past

Promotes videodisk as medium for information storage, retrieval

XIAN, China — Two thousand years after the end of his reign, China's first emperor is still at the center of potentially great change both for the nation he helped create and for students, researchers and data base administrators worldwide.

Information about Emperor Qin Shi Huang Di, including video and still pictures of artifacts unearthed near his tomb outside this ancient capital city, is being compiled and entered into an integrated visual, audio and textual data base. Researchers will use the data base both to develop courseware for use in the U.S., China and other countries and to promote the videodisk as a medium for intensive data storage

and retrieval.

When it is completed next year, "Project Emperor-I: China's Treasure Revealed Via Videodisk Technology," will allow researchers and students to tap into a data base containing about 4,000 still images, 200 segments of motion video and more than 4,200 related records of text.


Users will be able to call up Ascii files and Chinese calligraphic text, as well as still and motion pictures from the archaeological excavation and a number of museums. In addition, they will be able to see and hear a series of oral histories — taped interviews with a number of experts from different Chinese cities.

"Information science is moving into a multimedia age right now. We are no longer satisfied with [3- by 5-in.] cards, books and periodicals alone," according to Ching-chih Chen, principal investigator and project director of Emperor-I. "We want to have the printed format, but we also want to see with our own eyes, hear the sound, see the motion."

The project's multimedia data base, which is about to go into production, will allow researchers to do just that, according to Rus Gant, a research fellow at MIT's Center for Advanced Visual Studies. Gant is in charge of the data base construction.

He plans to use an applications generator — most likely the Microcomputer Picture Archive and Communications System (Mpacs) from Artam Ltd., an Israeli firm — to design a data base management system that is part relational.

See CHINA SR/23



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Project tracks emperor's ruthless, farsighted reign



Qin Shi Huang Di (circa 225 B.C.) created a unified empire after he ruthlessly defeated China's feudal warlords, who had held the country hostage to economic, political and cultural stagnation.

He waged an equally savage war against his empire's Confucian scholars because he thought their conservatism was a major force in the opposition to change. They had stood in the way of widespread acceptance of reforms such as standard weights and measures, a uniform calligraphic script, an improved system of roads and canals and the codification of laws.

The emperor was written about as a tyrant, but he was also a progressive ruler, determined to modernize his empire. An archaeological pit near his tomb outside of Xian in the People's Republic of China is currently serving as a laboratory setting for a project that focuses on advanced computer and optical memory systems.

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Project studies China's treasure

"Project Emperor-I: China's Treasure Revealed Via Videodisk Technology," is a two-year program sponsored by a \$219,245 grant from the National Endowment for the Humanities and a \$58,659 matching grant from Simmons College in Boston.

Emperor-I's project director, Ching-chih Chen, is professor and associate dean at Simmons' Graduate School of Library and Information Science. The project's research director, Robert D. Stueart, is dean of the graduate school.

The government of China, notably the Ministry of Culture and the Shaanxi Provincial Bureau of Culture and Cultural Relics, is assisting in the project.



Ivis systems like this will be used for multimedia data base access.

Special Report



More than 6,000 life-size statues have been unearthed near Xian, China.

CHINA from SR/22

tional and part hierarchical.

The project team has not yet made a commitment to the Mpacs system, but it has set up data relationships that will depend on flexible data base development and data retrieval capabilities. Data collected at the archaeological site and at other locations has been coded to fit within hierarchical data structures that are relationally cross-referenced.

Researchers have recorded detailed information, for example, about more than 6,000 life-size terracotta statues of soldiers and horses that archaeologists have unearthed here, according to Robert D. Stueart, research director of the project. For each statue, they have identified facts such as whether or not the stat-

ue is painted, what parts of it are painted and what the positions are of its arms.

These discrete facts will reside within specific fields (paint on arms, for example), the fields within screens (paint, for example) and the screens within sub-data bases (warriors, for example). The sub-data bases, in turn, will reside within a comprehensive data base for statues. Inverted keyword searches will allow users to branch through this information hierarchically.

The statue data base — like other data bases the project team creates — will also have sub-data bases for text, photos and video. Information in these sub-data bases will have a variety of cross-references to other information, and users will rely on relational capabilities to bring all the data together.

Emperor-I project team members will store still and motion pictures as well as text and sound on videodisks. They will store additional text on magnetic microcomputer disks. To retrieve data, they will use Digital Equipment Corp. Interactive Video Information System (Ivis) hardware.

The Ivis configuration for the project consists of a DEC 350 personal computer, a 10M-byte mass storage subsystem, a 13-in. color monitor, a videodisk player and a central Ivis unit, which provides an interface between the micro and the videodisk player.

With the hardware and DEC's Producer courseware authoring software, project workers will develop as many as seven interactive courses for different levels of users. Course developers will design branching routines that help general users, such as undergraduate students, navigate through data bases. They will also design programs that enable advanced users, such as research archaeologists, to pull information from different data bases into notebooks, or personal data bases.

Portability central to success

Project members also hope to develop courses with a system similar to Ivis that uses IBM hardware and software. Portability across different kinds of equipment, different subject areas and even different nationalities is central to Emperor-I's success, according to Gant.

"It is very important that the project not result in a one-of-a-kind system." Rather, he said, the project should serve as a general prototype "for how you gather information, store it and write instructional materials from it."

Chen said she hopes, in addition, that the project will raise the videodisk above its current status as a recreational tool and position it as a serious medium for information storage, processing and retrieval — for educators and information scientists alike.

"If all the project does is to help reveal something of China's history and culture to the western world, that would be enough," she said. "But we also have an opportunity to demonstrate how to use technologies that are practical and available today in bringing information to people throughout the world."

By September, the project team hopes to have some courses ready for user testing, and the courseware is scheduled to be completed by the end of next May, Gant said.



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CW6/24

Special Report

FUTURE from SR/2

Michael Geran, vice-president of research at E. F. Hutton & Co. in New York, also cited preparation as an obstacle. "Operating systems have specialized routines for data base processing, and existing applications are tied to those operating systems. To pull those applications out from the operating system [for use directly with a data base machine] would require a lot of up-front work. Users would rather devote that effort to new projects."

The investment in existing applications was also cited by William Inmon, a director at Denver-based Coopers & Lybrand. "One of the big barriers to success for the data base machine is that investment. The data base machine may be a wonderful idea, but if the vendors tell users 'throw away your existing systems and build them my way' they are going to fall flat on their faces."

According to Ronald Ross, editor of the "Data Base Newsletter," published by Boston-based Data Base Research Group, the primary concern among users is productivity. Users are not certain, he said, that the data base machine is the solution to increased productivity.

"Right now, users' attention is focused on one issue — productivity."

”

'People just do not know how to use a data base machine.'

— David James
Riggs National Bank

From that stems the interest in relational DBMS, fourth-generation languages and so forth," Ross said. "Productivity is the problem people are trying to solve, not the problem of large-capacity data bases and tying together heterogeneous processors. Companies will need a lot of experience with relational data bases of the size that cause performance problems before they look to data base machines."

But in the future, Ross said, a ground swell of interest in data base machines may arise when users migrate existing production applications to a relational DBMS. "That shift might point the way to a better relational engine. But it is at least three years away. Most companies have not gone relational yet, and they clearly have not built up relational data bases to the size that performance is a problem. Neither have they switched transaction applications to relational."

But Ross and others agreed that the appeal of hardware specifically designed for data management will grow, albeit slowly. "There is no doubt that in the future hardware will be radically different in its [data management] capabilities. Whether the current experiments with data base machines will be the shape of things to come is still up in the air."

Change is coming, James agreed. "The future? Yes, I believe it lies with the data base machine. Not everyone will adopt the technology. . . . But a change is coming in DBMS, and as the data base machine technology moves along, it will drag people in."



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MODULE from SR/14

base in modules offers three important advantages over the all-or-nothing approach:

■ First, it provides deliverable data base functions in less time than a nonmodular approach does. Management and users will be understandably skeptical if they are told that a project will take years to complete; during that time, business needs will change, expertise will be lost to employee turnover, and interest in the project may disappear. By undertaking the project as a series of modules, the project team can deliver a portion of the data base quickly. In addition, user interaction with a finished product early in the project can enhance the remaining development.

■ The second advantage modular

development offers is the opportunity to revise subsequent estimates and schedules and make design changes before beginning the remaining modules. An organization that attempts to convert completely to a data base has little historical data to use in making estimates or projecting schedules. Each module offers a new opportunity for the project team to review and revise.

■ Finally, modular development allows the time needed to absorb the dramatic changes that accompany implementation of a data base. Applications that traditionally have been batch oriented may become on-line, interactive systems. This will change or even eliminate job functions. Management and users need time to understand and acclimate to the new environment. If sufficient time and communications are available, the changes will not be threatening. Modular development and implementation will provide this time.

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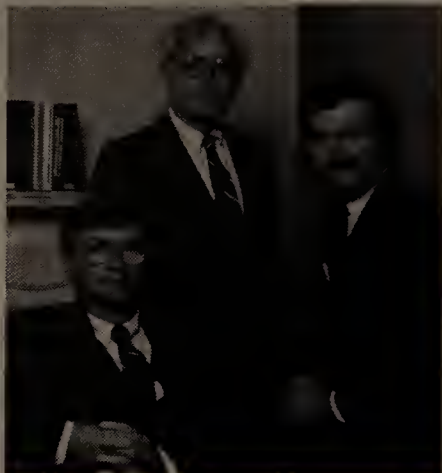
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Modular development allows time to absorb the dramatic changes that accompany implementation of a data base.

Individual development life cycles. Each module should have a separate development life cycle (see chart SR/14). The project team should begin by determining the individual data elements used in the module and their relationships as seen by the user. It should then normalize the relationships for maximum clarity and efficiency.

At this stage, a fourth-generation language will provide more benefits than a traditional one because of the increase in productivity and ease of revision it provides. With a high-level language, the project team can construct a working prototype in a minimal amount of time, allowing the user to interact with the development process early. This allows the remainder of the development to be an evolution between the user and the system.

Coordinated implementation. When a module is complete, the project manager must consider the best time to implement it. If immediate implementation would require the project team to develop many interface and conversion programs, the manager may find it beneficial to wait for the completion of a subsequent module and implement the modules together.

The nature of the data can also affect the timing of the implementation. A module that supports strictly annual data, for example, may be better implemented in January than in October. Management and users must be involved with the project team in each implementation decision.

Organizations converting from applications-based systems to a corporate data base are in for a long and difficult journey. The improvement in quality of the information resource and the organization's use of it will be worth the effort. Agreement on the destination will ensure that the project arrives.



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Technology, intelligent software guide market growth

By Shaku Atre
Special to CW†

In the past five years data base technology has been maturing and taking a catalyst position in automated data processing. In some installations the data base management system is used not only as a fancy access method for one application system but is shared by a number of application systems.

The DBMS is also extending beyond the terrain of the mainframes and progressing aggressively in the micro and supermicro areas in the information center setup. End-user computing is claiming about 20% of the current millions of instructions per second (Mips) today, and it is predicted to reach 60% to 75% of Mips usage by 1990. A major part of the Mips usage could be by data-based applications. As a result, the prediction of \$5 billion of revenue intake by the DBMS and ancillary products' vendors by 1990 seems to be easily achievable.

In what areas would data base technology need to make its mark in order to ring in \$5 billion in the not-too-distant future? The following sectors are advanced enough, as far as technology is concerned, to move into a production environment from the esoteric research and development environment of the vendors' camps. Software-oriented products will provide:

- Vertical integration of application software with DBMS as the driving force.
- Distributed data bases together with intelligent directory or data dictionary systems and mainframe-to-micro connections.
- The means for cooperative coexistence of the development, production, information and automated office centers with the DBMS as a common denominator.

All of these sectors will be using the conventional general-purpose data base management system.

A data base environment is I/O intensive, however. The three areas listed above are software oriented, and software alone is not known for reliev-

ing I/O-intensive work. Isn't I/O really hardware oriented? Wouldn't it then be appropriate to look for a hardware solution geared toward I/O-intensive data base work? Precisely. For this reason two areas that will advance rapidly in the coming years may be data base machines and intelligent data bases.

A data base machine consists of data base system software, hardware or firmware that is dedicated and tailored to perform some or all of the data base functions. It must use some hardware that is specially designed for data base management.

Two types of machines

There are two types of data base machines. One type still performs number crunching, in a linear processing mode using von Neumann architecture, and is used as a back-end processor. The other type performs parallel processing, which is a departure from von Neumann architecture, but also is used as a back-end processor. A data base machine may or may not use content-addressable memory. A data base machine may coexist with a host or may exist by itself as a minicomputer.

Looking back thirty years, most DP professionals would agree that software was invented to simulate what hardware was supposed to do in the first place. There were so many varied and intriguing uses of software that software itself established a self-perpetuating life. But software is limited by whatever hardware can or cannot do. Software is restricted to Add, Subtract and Shift. By comparison, the basic data manipulations in a data base environment are Search, Retrieve, Update, Insert, Delete and Move, rather than Add, Subtract and Shift. The mismatch of the von Neumann design to nonnumeric applications is the main cause of the complexity and inefficiencies of the present systems.

If technology can be matched more closely to data base applications, then perhaps the following

technologies will be more practical: high-level query languages; access of data base records using natural languages, speech and pictures; and problem solving using inference systems, with the help of expert systems utilizing intelligent data bases rooted in a knowledge-based management system. Inference drawing requires parallel processing. The relational data model with high-level data languages, exhibiting a high degree of data independence and ease of use, are requirements for improving human productivity in today's and tomorrow's offices.

Two bottlenecks affect performance

In conventional data base environments there are two major culprits affecting performance: the staging bottleneck and the communications bottleneck. To stage data into main memory from auxiliary storage is time consuming. Since data transfer from geographically dispersed areas is time consuming as well as expensive, data redundancy is introduced.

But these techniques introduce new problems in the areas of data updating, recovery, integrity and security. Special-purpose hardware, tailored toward distributed data base management and supporting data communications, would help alleviate these problems.

The technology is here, as can be seen from implementations by a number of data base machine manufacturers such as Britton-Lee, Inc., Teradata Corp., Intel Corp., Amperif Co., HDR Systems, Inc., Corem International and Mega/Net Corp., to name a few. But why isn't this field taking off faster? One reason is that one of the major players, IBM, hasn't shown its cards as of yet, and new ideas in this industry require a blue stamp in order to be considered as viable solutions for the marketplace.

Atre is president of Rye, N.Y.-based Atre International Consultants, Inc.

DB2, SQL/DS will fail if firms ignore training

By Joseph E. Wehr Jr.
Special to CW†

Almost every major IBM installation will at some time in the near future implement, or at least seriously consider implementing, IBM's DB2 or SQL/DS relational data base management system. As with any implementation, training will be a major factor in the system's success or failure.

That the two DBMS will gain wide acceptance should come as no surprise: Relational technology offers great flexibility, high-level query languages and other features that users find attractive. In addition, IBM's two relational systems — DB2 for MVS shops and SQL/DS for DOS/VM and VM environments — are the first major DBMS the firm has released since the late 1960s, when IMS came out.

That proper training is crucial to successful use of a DBMS is no surprise at all: Nearly everyone remembers the horror stories associated with the early days of IMS. Certainly, IMS had some inherent bugs that needed fixing, but the vast majority of disastrous implementations came about because of a lack of proper training.

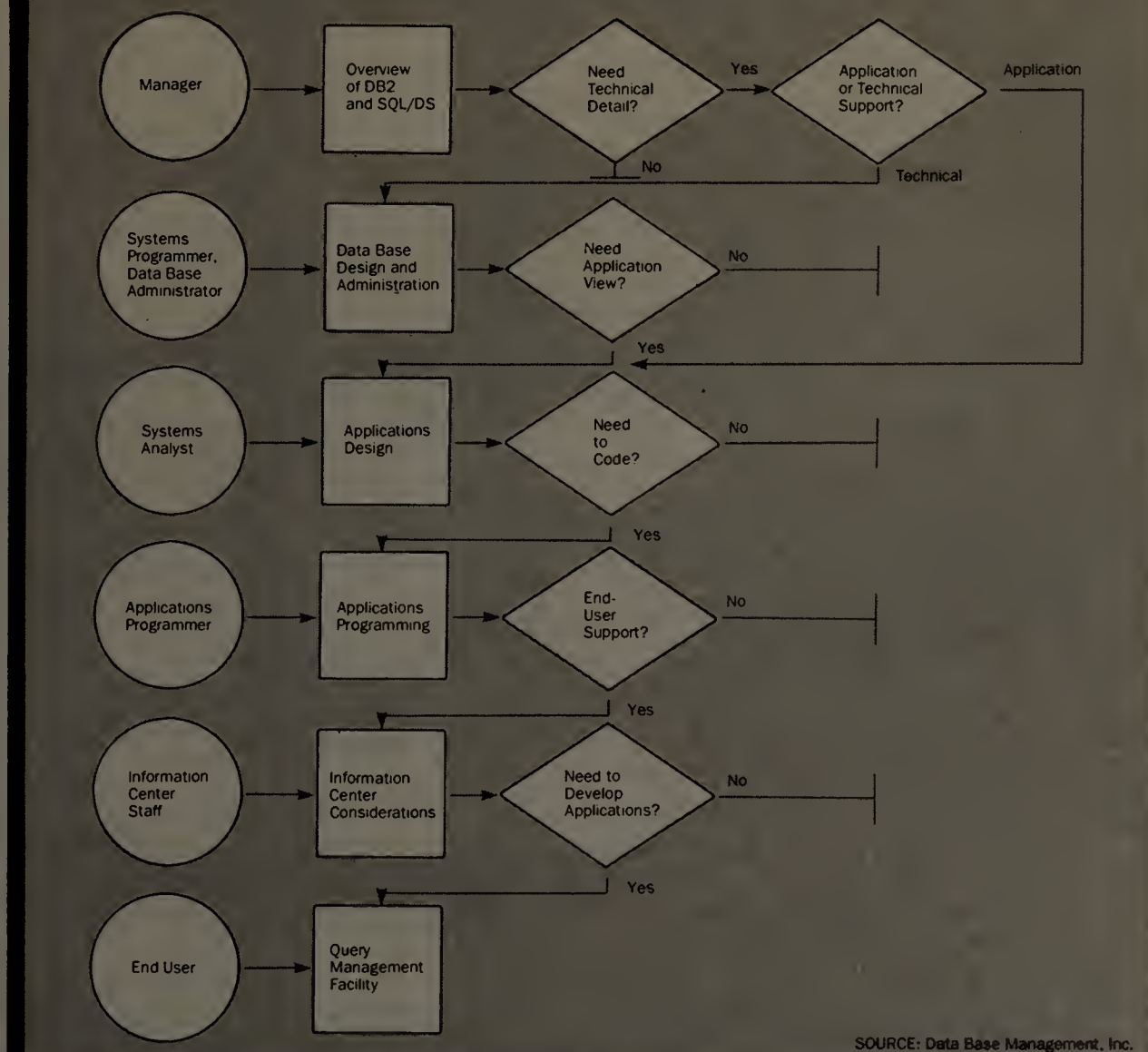
IMS implementations brought forward the idea that incorrect use of data retrieval and updating commands can dramatically increase demands on hardware and decrease processing efficiency. If users are not adequately trained in DB2 and SQL/DS, history may repeat itself.

Relational features like flexibility and ease of use should not lull management into complacency. Training requirements for DB2 and SQL/DS are somewhat different from those for IMS, but training should be no less stringent or extensive.

Most of the audiences that require training for DB2 and SQL/DS are no different from those that needed help with IMS. The following groups of people must all have some instruction:

- Managers.

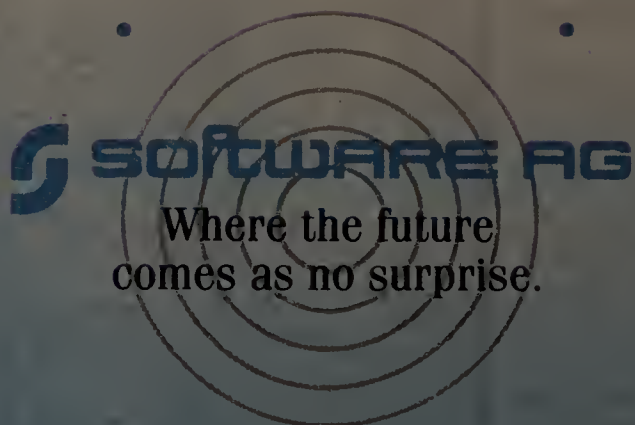
IBM DB2 and SQL/DS training



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Special Report

Selecting a DBMS: Match every application's demands

By Eugene W. Ossa
Special to CW†

All commercial data base management systems have their strengths and weaknesses, which prospective users must consider carefully. Identifying a package's inherent value, however, is not sufficient: Organizations looking for a DBMS must also identify their applications requirements and match them with different products' capabilities.

To select the best DBMS for a particular set of applications, an organization must set up — and follow — the following six-step evaluation:

- Establish an evaluation and selection team.
- Describe applications requirements.
- Identify evaluation criteria.
- Assign weights to the criteria.
- Rate each DBMS' capabilities against the criteria.
- Calculate overall DBMS ratings.

Naturally, the staff time devoted to each of these steps and the level of complexity required will depend on the scope of the project. Small, micro-based projects require less formal and less complex analyses than large-

er projects do, but they require analyses nonetheless.

Establish an evaluation team. The team must include both knowledgeable user representatives and people with technical DBMS expertise. Including both groups should eliminate the possibility of a technocratic slant or of user disappointment with the final choice.

A team leader should take responsibility for assuring an impartial and expeditious evaluation. The leader will be the focal point for all team activities and will be responsible for an open line of communication with other managers.

Describe applications requirements. To select the proper criteria for judging the DBMS, team members must understand system requirements. They also must have a thorough knowledge of the applications requirements to assign proper "weights" to the various selection criteria.

The idea of using a DBMS usually arises from a desire to use one or more of the following general DBMS capabilities:

- Variety of access methods.
- Flexible user interfaces.
- Data integrity.
- Data independence.
- Central control over physical storage.

■ Hierarchical storage device support.

■ Data concurrency.

The team should examine these capabilities and determine which ones best serve the organization's applications and to what extent. Team members must also pinpoint the specific demands that the organization's applications will make on a DBMS (see story SR/31). Once the team determines these demands, it must establish their fulfillment as a necessity.

DBMS packages that do not meet the special requirements of an organization's applications must be eliminated from consideration: No one would buy an otherwise perfect package that did not run on his organization's computer. Likewise, no one should consider a DBMS that does not support his firm's applications.

Identify evaluation and selection criteria. Before the team can make an evaluation, it must develop a comprehensive list of criteria. The list should be derived from a combination of user requirements and available data base technology.

The following list is a sample of what an organization might identify as desirable DBMS features:

- Data definition and representation capabilities.
- Support for different data structures.
- A variety of access methods and

retrieval capabilities.

■ A specific host language interface.

■ Ease of installation, use and/or change.

■ A convenient interface with an operating environment.

■ Flexible and powerful query processing and report generation.

■ Backup and recovery capabilities.

■ Security and privacy.

■ Realistic performance overhead.

■ Efficient management of physical storage.

Assign weights to criteria. Based on the previous identification of system requirements, user requirements and selection criteria, the team should assign each criterion a number that represents its relative importance, such as a value system from 1 to 10, with 10 the highest value.

Rate different DBMS packages. Several techniques are available to produce a common rating scale for fairly objective criteria — such as whether or not a DBMS supports a given data structure — and more subjective criteria — such as how good a package's documentation is.

A common technique is to measure how well — on a scale of 0 to 9 — a DBMS meets a certain criterion. A

Ossa is a computer specialist for the data base technology and control section of the Internal Revenue Service's Standards Branch in Washington, D.C.

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Special Report

to product's capabilities

"0" indicates the DBMS does not meet the criterion at all; a "9" indicates that it meets the criterion completely. On such a scale, "yes" and "no" answers to objective questions such as "Does the DBMS support a given data structure?" are rated as "9" and "0," respectively. Answers to subjective questions such as "How good is the documentation?" can fall anywhere within the scale's range.

Naturally, a package that would receive a "0" rating for a capability the organization has deemed critical should have been eliminated from consideration by this time.

Team members can tap in to a variety of resources that will help them evaluate the level of a DBMS' compliance to selection criteria. Some of these follow:

- Vendor documentation and presentations.
- Articles, trade sources and reports from research firms.
- Evaluations made by government agencies and private industry.
- Hands-on experience.
- Consultants.
- Interviews with current users.

Calculate the score for each DBMS package. For every package under consideration, the team will now multiply a rating by a weight for each criterion. The sum of all the results is the score for any given package.

Now the team should present its organization's management with a report for review and/or approval. The report should include the names of the packages that earn the highest scores, copies of the team's evaluation, a narrative account that justifies any recommendation the team decides to make and any hard-copy source material that has been collected during the evaluation.

An organization that follows this six-step methodology should meet with general success in its DBMS selection. To do so, however, the organization must go beyond the letter of the evaluation structure and keep two overriding ideas in mind.

First, this methodology for DBMS selection requires extensive preparation — not only prior to DBMS selection, but also prior to the selection of selection criteria. This is deliberate and very important.

Second, the methodology involves the user at all levels. Only through heavy user involvement throughout the selection process can a DBMS meet with success and acceptance once it is implemented.

This article is a condensation of a larger document, "Evaluation and Selection of Data Base Management System Packages," copies of which are available free from the IRS, D:C:H:S, Suite 1410 — BXR, 1111 Constitution Ave. N.W., Washington, D.C. 20224.

Evaluation checklist
for applications needs

An organization's set of applications will make specific demands of any data base management system. These demands must be recognized and met if a DBMS implementation is to succeed.

For each application, the DBMS evaluation team should do the following:

- Identify the application as an informational or production type.

- Estimate data volume requirements.

- Identify special requirements and constraints.

Informational and production-type applications.

Informational systems tend to have the characteristics listed below:

- A low frequency of update or an update procedure that calls for replacing a large portion of the data base.

- Ad hoc reporting requirements.

- Access paths that are not predefined.

- Loosely coupled data relationships.

Production systems, on the other hand, tend to have a high frequency of update to the data base, on a sin-

gle-transaction basis.

A relational or logically inverted-file DBMS best serves informational applications, while a DBMS with a Codasyl, tree or network structure best serves production-type applications.

Data volume requirements.

Any estimate of data volume requirements should take into account both the approximate volume of existing data and any potential data growth.

Special requirements and constraints.

Typically, an organization should identify the following parameters:

- Special security or privacy applications.

- Ability to create audit trails to accesses and transactions.

- An organization's specific hardware environment.

- Any specific interfaces to a software package.

- Response time limits.

- Maximum key fields.

- Ease of installation or modification.

- Data dictionary support.

- Local-area networking.

- Available resources.

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Special Report

TRAINING from SR/27

- Technical support staff members.
- Data and data base administrators.
- Applications developers.

The type of training that each group must receive, however, has changed. DB2 and SQL/DS entail fewer technical considerations than earlier DBMS, so training for technical support staff members will be reduced somewhat. Training for data and data base administrators will emphasize on data administration.

But one additional audience — that composed of end users — must receive training. This is an audience for which IMS training was not provided at all. End users will want to take advantage of the fourth-generation language capabilities of DB2 and SQL/DS.

Figure 1 (see SR/27) indicates the paths that different audiences should follow to mastery of DB2 and SQL/DS. Each path contains one or more of the following segments of an overall, six-course curriculum:

- Overview.
- Data base design and administration.
- Applications design.
- Applications programming.
- Information center considerations.
- Query Management Facility (QMF) use.

Overview. This should be aimed primarily at managers, who need a brief, practical introduction to DB2 and SQL/DS. The overview will enable managers to understand the intent of DB2 and SQL/DS; the DBMS' relationship to existing IBM software such as CICS, IMS and TSO; and the concepts and terminology associated with DB2 and SQL/DS data bases. With this knowledge, managers can install, administer and manage functions affected by DB2 and SQL/DS with awareness of how the DBMS will affect user communities.

Data base design and administration. This should be oriented mainly toward technical support staff members, such as data base administrators and senior applications personnel. The course will provide these employees with an in-depth understanding of the more technical capabilities of DB2 and SQL/DS. It should concentrate on logical data base design and administration.

Applications design. This course should be oriented mainly toward systems analysts and senior programmers, who will be involved in designing applications that use DB2 and SQL/DS data bases. Applications design training will provide students with an understanding of a DBMS' intent and with knowledge of the system's concepts and terminology. The course should also identify the advantages and disadvantages of DB2 and SQL/DS, compared with IMS, Vsam and other access methods.

The students in this course should be provided with tools they can use to select the best access method for a specific application. After they have the necessary tools, they can design DB2 and SQL/DS tables to allow for flexible and efficient processing.

Applications programming. This course should be aimed primarily toward applications programmers, who need to code SQL statements to access DB2 and SQL/DS data bases. The main purpose of applications pro-

gramming training is to provide information on how to retrieve, insert, update and delete information from DB2 and SQL/DS tables.

users learn DB2, SQL/DS and the language to access the data bases.

The course's primary purpose is to provide a basic knowledge of the

”

End users received no instruction in IMS, but they will need DB2 and SQL training.

Information center considerations. Many end users become aware of high-level tools and learn how to use them through information centers, which have become popular in large organizations. This course addresses the training requirements of information center staff members, who will be charged with helping end

DBMS' capabilities — specifically as these relate to end-user needs — so information center staff members can support end users and their business requirements.

QMF use. This course, aimed primarily at end users, should provide training in QMF, the fourth-generation language that accesses DB2 and

SQL/DS data bases to create reports and maintain information. A major topic in the course should be how to perform query by example.

These six courses fully address the range of training required in an organization. Courses may be combined, expanded or segmented differently to lead to a different structure of offerings. Regardless of the number and structure of course offerings, however, the above topics and audiences must be addressed by any comprehensive DB2 and SQL/DS curriculum.

Wehr is vice-president of Data Base Management, Inc., a Manchester, Conn.-based firm that provides data base and data communications consulting and educational services to Fortune 1,000 companies.

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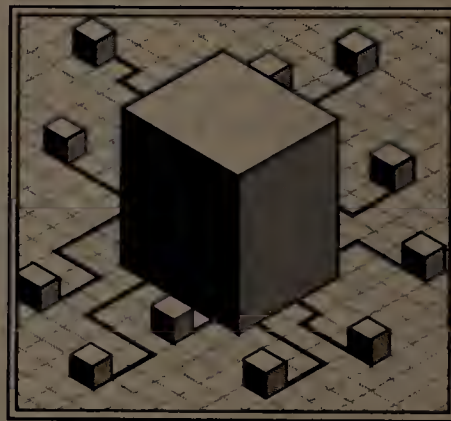
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SEARCH from SR/18

its needs exactly in order to avoid the pitfalls of a poor DBMS choice. Taylor said any critical applications the software could not handle would translate to thousands of dollars worth of lost potential, as the potential would be lost for more than 100 users. "Had we simply gone out and purchased the most popular package or purchased the one that looked the best in the advertisements, we would have made a half-million dollar mistake," he said.

Based on its evaluation results, Service Merchandise decided to standardize around Innovative Software, Inc.'s Smart Data Manager. Taylor said the package fell short of the firm's requirement for ease of use because its documentation was not as precise as the firm had hoped. The documentation was poorly indexed, he said, and it lacked specific examples that could help users understand some advanced features.

But Smart Data Manager met more of Service Merchandise's critical requirements better than other packages did, according to Taylor. In general, he said, DBMS packages that offered sufficient flexibility were too difficult for nontechnical employees to learn and use, and software that users could learn easily did not offer enough capabilities.

The firm began installing the DBMS on its micros last fall. Since then, the information center staff has trained about 75 users. Employees have set up applications to track the whereabouts of financial records that circulate among employees, to run statistical analyses of showroom operation factors and to generate a number of management reports.

Most of the applications have been helpful in reducing the number of man-hours required to analyze data and produce reports, which employees had done manually. Taylor said the firm also gained the ability to run cross-tabulations on data, which had been virtually impossible to do by hand.

THOMAS from SR/13

ple get from producing actual results can interest them in more advanced work. Since Thomas brought up its data base, about 10 managers have become relatively proficient users.

"What has happened . . . has surpassed my expectations," Klein said. "People got so good at Oracle in a short period of time that they began to go into other departments and teach each other what they knew."

Two of the applications that users have designed are the following:

- An advertising system that tracks information on the more than 60,000 ads that run in the directory. A supervisor in the firm's production department put the application together. "By trade, he's a master printer," Klein said, "and he'd never laid eyes on a computer before." The only help the man required was with a program to integrate a bar-code reader into the system.

- A telecommunications application to track bills, equipment requests, change requests and facilities such as Wats lines. Thomas' telecommunications analyst designed the system. "[She] would never have called up our old data center and requested the application," Klein said.

Special Report

Service Merchandise, Inc. micro data base management system criteria

Flexibility

- Supports 30,000 records per file and 30 fields per record
- Performs relational analyses
- Supports printed forms output design and data base field addition and deletion
- Accommodates diverse corporate applications at end-user level

User-friendliness

- Offers on-line Help Information
- Has clear documentation
- Can learn basic system in less than three days
- After training, first-time users can operate system without assistance

Data Interchangeability

- Receives and transmits Ascii and Data Interchange Format data files

Vendor Standing/System Future

- Basic DBMS structure and design allow for easy upgrades
- Vendor has track record for enhancing product and spending funds for R&D
- Vendor financially stable

Functional Integration

- Easily transfers information to graphics displays or WP documents

Data Security and Integrity

- Includes passwords at data entry and file levels
- Backs up and saves data files at convenient points during operation

Efficient Operation

- Runs on 256K bytes of memory or less
- Runs efficiently on IBM Personal Computer XT, with adequate response time and efficient use of hard disk
- Supports standard printers and plotters

Source: Service Merchandise, Inc.

Service Merchandise, Inc. matched vendors' micro DBMS offerings against this detailed list of criteria to find a standard package for the more than 100 micro-computers at its corporate headquarters and other administrative sites.

"Users don't know what's possible, or what's necessary, until they dig in and create something for themselves."

Users' familiarity with decision support systems will play an important role in the company's future, as

decision support tools will allow managers to identify opportunities in emerging fields like electronic publishing, according to Klein. "When employees can make data work for them . . . they begin to look at the information with new eyes," he said.

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Computer type: Operating system:

Data independence, integrity key to relational DBMS

By Kenneth Szczesny
and David Ditmars
Special to CW†

Data base management system design experts have long been discussing what is essential in a relational data base management system. The two most important and most overlooked features in these discussions are that a complete relational DBMS must have enforceable data independence and referential integrity constraints. If a system lacks either of these key features, it is not a complete system and will not provide the control of data processing it should.

A relational DBMS employs the relational method to store, manipulate

and retrieve information. For data to be processed using relational operations, it must be organized in independent constructs, referred to as two-dimensional tables or relations. Various types of data, for example, numeric and textual information, reside in these tables so that they are logically independent of the information in other data base tables.

The relational operations are exercised upon the data in the relations using their values to create tables. The user specifies what tables and values are involved using English-like commands. This dynamic extraction and combination of data from the tables is what gives the relational

DBMS its flexibility and power.

The principal relational operations are projections, restrictions and joins. Figuratively, the projection makes a vertical slice through a relation, selecting columns by name and extracting the values contained in those columns.

A restriction makes a horizontal slice through a relation, selecting record values as specified. And the join creates a relation from two or more existing relations by associating common column names, referred to in relational vocabulary as "attributes from a common domain."

All this manipulation is based on the element values in the relations,

which is why relational DBMS are called value-based systems.

Conceptually, extracting information from tables using an English-like command language is relatively simple. Novice users can quickly grasp how to be productive, since they are performing tasks in much the same way they have performed them manually. Most everyone agrees that this simplicity and ease of use are the key benefits of relational systems.

The complexity lies in the design underlying the easy-to-understand relational data base organization, data query and manipulation. Establishing and maintaining data independence and integrity within a relational data base is the challenge. To be truly independent, not only must data be organized in tabular relations, but it must also be independent of its conceptual representation in the data base's logical description and from users' individual representations or views of the data base.

This data independence needs to be enforced at three levels using the three following discrete models:

- The structural (physical).
- The logical (conceptual).
- The local (user).

Few systems have such multilevel data independence. And those that do support one or two data models do not necessarily enforce data independence.

The three-tiered approach enables changes to be made to the way the data is physically stored without necessarily affecting how the data base is defined to the users. Similarly, changes may be made to the data base as defined at the logical level, where element and record names are specified, without necessarily affecting the way the data is viewed by individual users.

Finally, the users' views of the data base may be altered without affecting its physical or logical organization. The three models enable data base modification without having to dump or reload data or recode their relationships. And when the three levels of data independence are enforced, users cannot inadvertently corrupt the data when making modifications.

Enforcing data integrity

Enforcement of data integrity is achieved by various mechanisms, especially validation techniques and constraints. Of the latter, referential integrity constraints are particularly helpful and valuable. Referential constraints are rules specified in the data base's central data dictionary that establish relationships among tables and elements within them.

The system enforces the constraints so any attempt to enter data that violates them is rejected, thus maintaining data base integrity.

The referential integrity rules enable the data base administrator who designs the configuration of specific applications to specify hierarchical and network relationships among the data base record types or tables.

Szczesny is the chief designer of DM, a relational DBMS from Battelle Software Products Center, and Ditmars is a product manager for that firm, located in Columbus, Ohio.

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MICROCOMPUTERS

MICRO BITS

Will Jazz start business singing Mac's song?

By Rick LePage
Special to CW

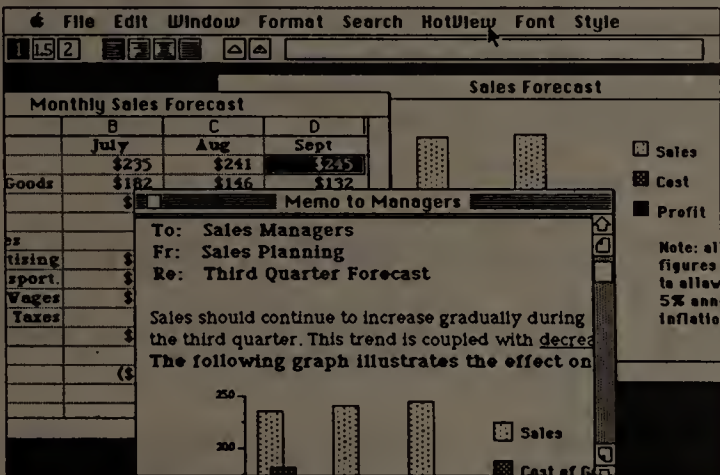
After more than a year of hype and speculation, Lotus Development Corp. has finally placed Jazz in the stores. The five-function integrated package for the Apple Computer, Inc. Macintosh offers spreadsheet, graphics, word processing, data base and communications modules. It sells for \$595 and has been billed as the software cornerstone to Apple's Macintosh Office plans.

Whether Lotus' package will live up to all the expectations will not be known until at least the end of the year, but initial reports indicate that Jazz is being taken very seriously by the end user.

Jazz does perform the tasks that Lotus claims it does. Whether it will do them efficiently and completely enough for constant use is a question users will have to answer. If Jazz could run on a Macintosh with 1M byte of random-access memory (RAM) and a 20M-byte hard disk drive, it would approach the ideal business software.

LePage is industry editor of "Macintosh," a Framingham, Mass.-based newsletter for Apple Computer, Inc. Macintosh users.

The first impression a Jazz user gets is one of opulence. Before Jazz is even running on the Mac, it is obvious that Lotus put quite a bit of time and thought into its design. The package weighs at least five pounds and comes with three manuals, four disks, a portfolio that



Lotus Development Corp.'s Jazz permits Macintosh users to view several open documents simultaneously and to move between documents easily.

holds the manual and disks, a disk wallet and a number of pamphlets. The manuals are spiral-bound on thick, shiny paper; the ribbed, black rubber portfolio could be mistaken for a car mat when it is folded out; and the disk wallet holds six disks and folds up easily enough to be slipped into a briefcase.

Lotus makes it very easy to get Jazz started. One pamphlet gives step-by-step instructions on how to get Jazz up and running. Once it is loaded, a Jazz primer lets computer novices learn the basic ins and outs of the program. The primer is well organized and the examples are very good. Provided that a user is comfortable with the Macintosh, it should be no problem learning to maneuver around the separate parts of Jazz.

Jazz is a true integrated package — a user can have a number of different files open on the screen at one time, depending on the amount of memory that each file requires.

At one point, I had six different file types averaging 20K bytes open on the screen and had no problems working in each one. However, when I opened a seventh file, I received two error messages: one stating that there was not enough memory to perform a search, another stating the same problem with regard to a cut-and-paste operation. My best advice would be to close any unnecessary files when you are done working on them.

Jazz's Hotview feature allows users to link data across file types. The user can set up a "what-if" situation in a spreadsheet. See JAZZ page 63

■ Kaypro introduced an IBM Personal Computer AT-compatible system with a hard disk drive/54

■ TI introduced a dot matrix printer for shared resource environments/55

INSIDE

Software/55

Users praise Gold Hill's micro-based Common Lisp

Called low-cost tool for AI development

By Eric Bender
CW Staff

Golden Common Lisp, a Common Lisp subset offered by Gold Hill Computers, Inc. of Cambridge, Mass., is finding many roles in artificial intelligence software development, applications delivery and training on IBM Personal Computers, according to early users.

Tailoring the Common Lisp standard to fit within the microcomputer's tight hardware constraints, Gold Hill made reasonable trade-offs, users said, and they generally gave Golden Common Lisp high marks. Their most frequent request was for a compiler.

"Before we bought Golden Common Lisp, the only real alternative in terms of a development environment was a \$100,000 Lisp machine," said William Brodie, president of Brodie Associates in Boston, a consulting firm specializing in AI software.

Starting work on a programmer's tool kit for natural-language interfaces, Brodie evaluated several microcomputer Lisp packages. Golden Common Lisp offered the richest development environment, he said. Additionally, at the time it was the only



William Brodie of Brodie Associates has developed natural-language software with Golden Common Lisp.

personal computer Common Lisp, "which was important in terms of portability."

Another Golden Common Lisp customer, a large scientific instrumentation supplier, delivered an experiment-planning expert system on a personal computer. The expert system, which includes roughly 1,000 production rules, was developed with Xerox Corp.'s Interlisp on a Xerox 1108 and then ported over to Golden Common Lisp.

"It was hard porting down, but that was not necessarily Gold Hill's fault," said a senior AI engineer at the instrumentation firm. "They were excellent to work with." His complaint, instead, centered on Com-

See LISP page 58

AI on micros stirs debate



SMALL TALK
Eric Bender
CW Senior Editor

Are artificial intelligence and personal computers still mutually exclusive?

Opinions varied wildly, but many attendees at a Future Computing, Inc. forum on that topic held in Dallas two weeks ago maintained that today's personal computers cannot handle genuine AI applications, however AI may be defined. Following are other snapshots from the conference:

■ AI is now an ideal "dilettante's marketplace," commented Ann Winblad, a San Francisco-based consultant. As AI hardware and software improve and prices drop, MIS personnel can learn about technologies much more inexpensively than in previous years, she pointed out.

■ "There's more to AI than expert systems and natural language," according to Larry Tesler, Apple Computer, Inc.'s manager of new architectures. AI-based software could identify users for security purposes, perhaps by examining typing patterns, Tesler suggested. Or, the software might take note of tasks and infer user preferences or extrapolate se-

quences of actions.

Software packages could act in the way some describe as "intelligent agents," Tesler noted. "The idea is that they're an entity representing you in the computer." Among the roles software could play, he suggested, would be to "represent the client." As one example, users could build their preferences into a scheduling program that "goes out and negotiates with other people's agents."

■ No one should expect an AI equivalent of Lotus Development Corp.'s 1-2-3 package, said Beau Shiel, manager of product development at Xerox Artificial Intelligence Systems. "The leverage of AI programs is in the specific knowledge, and the more specific the knowledge, the narrower the program," Shiel said. "Information management is going to be the hot area for AI on personal computers, more than expert systems," predicted Paul Weiss, vice-president for research and development at Arity Corp. "Expert systems tend to be vertical."

■ Artelligence President Paul Robertson gave a wry description of an optimistic scenario for acquiring knowledge bases: "The expert sits in front of system for a day and spits forward his life's knowledge onto a floppy disk for future gener-

See AI page 56

MICROCOMPUTERS

IDC survey: Maintenance ranks high in system selection

By Maura McEnaney
CW Staff

FRAMINGHAM, Mass. — Not unlike their large-systems colleagues, buyers of microcomputers and workstations consider maintenance services to be an integral factor in the purchasing decision, a study here has found.

International Data Corp.'s (IDC) "Customer Satisfaction Survey: Maintenance for Workstations and Micros" reports that more than 83% of surveyed microcomputer and workstation buyers consider service when buying a particular system. Among these buyers, response time and the availability of on-site services are two critical factors. Least important maintenance factors cited were the ability to service multivendor systems and optional service methods, the survey said.

Although maintenance was an important factor in the decision to buy a particular system, users are spending little on micro and workstation maintenance, the survey said. Approximately 60% of the respondents said their annual service costs fell between 1% and 10% of the price that they paid for the equipment, while

another third said service costs ranged from 10% to 20%.

System manufacturers are netting the majority of the service contracts, according to IDC. Of the 192 responses from microcomputer and workstation users throughout the country, 66% relied on vendors for workstation maintenance, 15% selected third-party maintenance organizations, and only 6% selected dealer maintenance services.

Approximately 9% of the users said they did not care who maintained their systems, and 4% said they preferred to maintain their own equipment, IDC noted.

No organizations are providing fast enough service, according to the IDC study. Approximately 85% of the users said they have needed emergency services in four hours or less, and 75% wanted services within four hours for nonemergency situations. However, only 47% of the users got this type of response during emergency situations and only 44% received it in nonemergency situations.

According to IDC, third-party organizations responded to emergency service calls in an average of 12.4 hours, compared with 8.6 hours for

those using the manufacturer's service organization.

On-site maintenance was preferred by three-quarters of the workstation and microcomputer users, while 12% preferred carry-in services. According to IDC, 6.5% of the respondents requested service on a time-and-materials basis. Mail-in services, extended warranty and courier services accounted for less than 7% of the service options chosen by respondents, IDC noted.

Customer satisfaction with vendor maintenance services varied depending on the vendor. For example, the IDC survey noted that one-third of the users of Wang Laboratories, Inc. microcomputers and workstations

who also used the company for maintenance services said they were getting less than their money's worth in services, compared with 20% for Hewlett-Packard Co. microcomputer and workstation users and 8% for IBM equipment users.

Nevertheless, users said they were "reasonably satisfied" with service organizations, the study said. "About two-thirds of the sample said they got value equal to or greater than what they paid for the service, and 91% of the respondents said they would renew their existing service arrangements."

The report costs \$2,500 and is available from IDC, 5 Speen St., Framingham, Mass. 01701.

Kaypro unveils hard-disk release of IBM micro-compatible machine

SOLANA BEACH, Calif. — Kaypro Corp. has announced a hard-disk version of its 286I, a machine said to be compatible with the IBM Personal Computer AT.

The 286I Model C, priced at \$4,795, reportedly offers 20M bytes of formatted hard-disk storage. It also includes 640K bytes of random-access memory and Microsoft Corp.'s GW-Basic programming language,

the vendor said.

Also included are a 1.2M-byte diskette drive and seven open expansion slots. According to Kaypro, the machine offers parallel and serial ports and support for up to eight additional users.

The unit is currently available, the vendor said.

Kaypro is located at 533 Stevens Ave., Solana Beach, Calif. 92075.

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MICROCOMPUTERS

Polygon Associates unveils terminal emulation package

ST. LOUIS — Polygon Associates, Inc. has introduced its Poly-Com/220 terminal emulation and file transfer software, an addition to the company's family of terminal emulation and file transfer programs.

The Poly-Com/220 package reportedly allows the IBM Personal Computer to be used as a Digital Equipment Corp. VT52, VT102 and VT220 terminal and allows file transfers between the IBM Personal Computer and another IBM Personal Computer or a DEC minicomputer.

Poly-Com/220 resides in the microcomputer's memory and can be ac-

cessed by a hot key.

All VT100 and VT200 keys are implemented, as are DEC's international 8-bit character set and the Compose key, according to Polygon Associates.

The system is backward compatible with previous Poly-Com packages. Users of previous versions can upgrade to the Poly-Com/220 version for \$52.

The package costs \$200, the vendor said.

Polygon Associates is located at 1024 Executive Pkwy., St. Louis, Mo. 63141.

TI dot matrix printer out for IBM micros

AUSTIN, Texas — Texas Instruments, Inc. has introduced the Omni 800 Model 880 AT dot matrix printer for use with the IBM Personal Computer XT and AT, TI Business-Pro and Professional personal computers and the Apple Computer, Inc. Macintosh.

The Model 880 AT reportedly was designed for shared-resource environments and offers printing at 300 char./sec. draft mode and 75 char./sec. correspondence printing mode.

It also includes four read-only memory sockets for optional fonts and character sets, according to the vendor.

The Model 880 AT, available this month, is priced at \$2,195.

TI's Data Systems Group can be reached through P.O. Box 809063, Dallas, Texas 75380.

SOFTWARE

■ Group L Corp. has introduced Textbank/PC software for managing textual information on the IBM Personal Computer XT and AT.

Textbank/PC reportedly allows users to build and search an information base, which, unlike a data base, can accommodate unstructured information. It is said to handle such textual materials as reports, correspondence and contracts.

Using Textbank/PC, a search reportedly can be made of the information base for any word, part of any word, word combination or word proximity.

Textbank/PC is priced at \$995.

Group L, 481 Carlisle Drive, Herndon, Va. 22070.

■ Sentry Software has introduced Disksafe security software for hard disk drives in use with the IBM Personal Computer XT and AT and 3270 Personal Computer.

Disksafe reportedly protects a user's hard disk from unauthorized copying, viewing or manipulation. To operate, authorized users insert a

Continued on page 56

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MICROCOMPUTERS

Continued from page 55

"softkey" diskette into the A drive and enter their password. DiskSafe then automatically locks or unlocks the disk. If the softkey is not inserted in the A drive, use of the appropriate password will not provide access.

The software, which requires IBM's PC-DOS 2.0 or later, costs \$49.

Sentry Software, P.O. Box AL, Los Gatos, Calif. 95031.

■ **Structured Software Systems, Inc.** has announced HPL-Plus, an enhanced version of Hewlett-Packard Co.'s HP Language (HPL) operating system for HP's Series 200 desktop computers.

HPL-Plus includes the features of HPL Version 2.1 and also supports the HP 9133 Winchester disk drives running the double-sided, 3½-in. mi-

crofloppy disk.

HPL-Plus costs \$600.

Structured Software Systems, 1072 Irick Road, Mount Holly, N.J. 08060.

■ **Polytel Computer Products Corp.** has announced Version 1.6 of its Keyport 300 system and development software for the IBM Personal Computer and Personal Computer XT and AT.

Keyport 300 is a touch pad with 300 programmable keys that are used to display a program's command functions with labeled or illustrated overlays. Version 1.6 includes conditional execution, which reportedly is the ability to program a key to execute only if a condition is true or false. Conditions can be set to include finding which key was previously

pressed and certain clock times or dates. The version includes numeric and string variables, which can be assigned, passed, mathematically manipulated and tested.

Also featured is the ability to load and save a Key Definition Table (KDT), a file of previously defined Keyport keys, by pressing one key, the vendor said. Subdirectory path names can be used by an application developer to load or save a KDT for a novice end user.

Current Keyport 300 users will receive Version 1.6 for a \$10 handling fee. The price for new users is \$195. Predesigned overlays and commands for programs such as Micropro International Corp.'s Wordstar and Lotus Development Corp.'s 1-2-3 cost \$79 each.

Polytel, Suite 310, 1250 Oakmead Pkwy., Sunnyvale, Calif. 94086.

■ **Dinan, Inc.** has introduced insurance applications software for the IBM Personal Computer and Personal Computer XT and AT.

Compare allows insurance agents to identify small-group health plans and provides agents with a benefit comparison of plans that meet the clients' benefits requirements, the vendor said.

The product can outline the 50 most competitive medical plans in the marketplace, ranking from least to most expensive, the vendor said.

Rates and benefits information reportedly is provided to the vendor by the plan's home office and is updated monthly. Compare costs \$1,395.

Dinan, 6455 Almaden Expwy., San Jose, Calif. 95160.

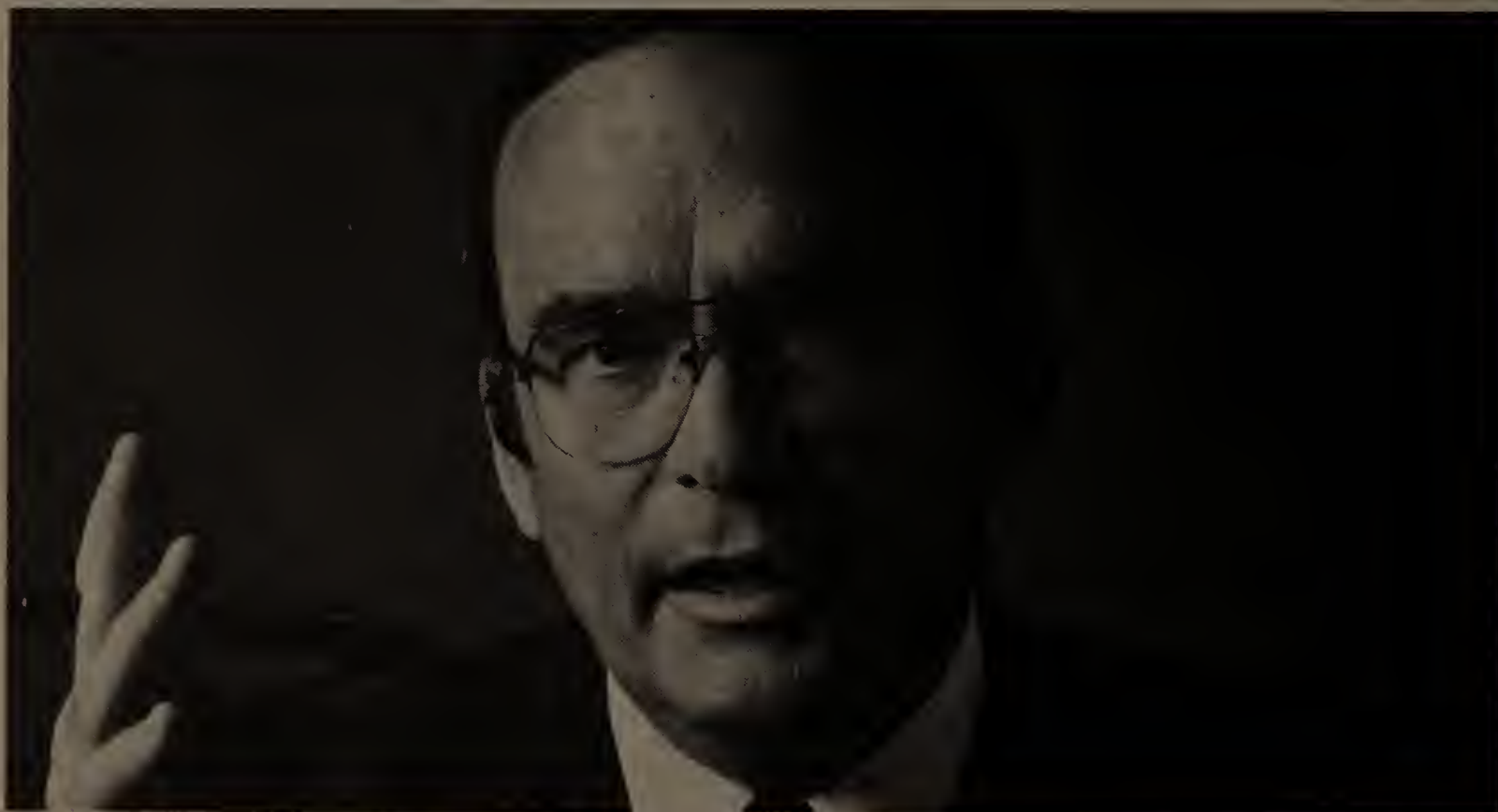
■ **Provue Development Corp.** has announced enhancement of its Provue data base management package for the Apple Computer, Inc. Macintosh.

Provue is now said to include charts, macros, relational joining of data bases and the ability to zoom between single- and multiple-record layouts. It reportedly can produce bar, column, line, area and pie charts directly from data without cut-and-paste operations.

The package will still cost \$295.

Provue Development, 222 22nd St., Huntington Beach, Calif. 92648.

See **SOFTWARE** page 62



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ple, with our 3780 you can transmit large blocks of data, error-free, with off-hours scheduling.

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AI from page 53

ations to enjoy."

But Robertson advised against expecting software "that will automate the building of expert systems, except for very standard, stereotyped systems."

■ "The marketplace is bottlenecked by support and training issues," which personal computers will help to address, said Stan Curtis, president of Gold Hill Computers, Inc.

Maintenance issues may also favor microcomputers, according to Curtis. "Walk around an AI show, and you see Lisp machines go up and down in the course of a week."

■ New applications tend to see "slow, gradual adoption," remarked Lightyear, Inc. President Terence Garnett.

"Look at spreadsheets — it's taken five years to get where we are, and that's merely an information grid that people put numbers into," Garnett said.

■ Natural-language techniques need to be more robust, give better detection of ambiguities, provide the ability to show why, and offer automatic learning capabilities, said Microrim, Inc. Chairman Wayne Erickson.

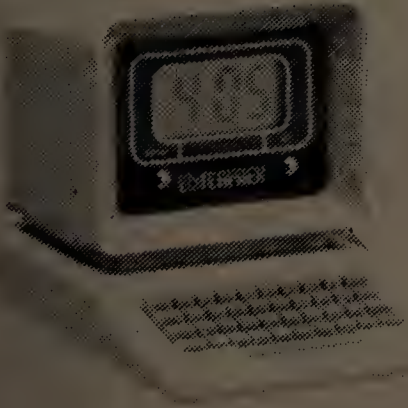
However, "if you customize natural language too much, expertise may be hidden," Erickson warned. "The need for some sort of standardization is still there."

■ Speaking of natural language, the number of AI definitions floating around more than matched the number of attendees. Among them were "anything impossible," "anything interesting" and "whatever hasn't been done yet."

"AI is not something that a program either has or doesn't have," according to Arity's Weiss. "Symbolic processing fills the gap between conventional programming and [AI]."

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MICROCOMPUTERS

LISP from page 53

mon Lisp. "There are features in just about every other Lisp that aren't in Common Lisp," he said.

Like other users, the engineer is looking forward to a Golden Common Lisp compiler. In the worst case tested so far, the experiment planning system took five minutes to run, he said.

"Lisp is rather enormous in its memory requirements," commented Greg Kearsley, chief scientist with Courseware in San Diego, which creates customized training courses and is looking at ways to add "intelligent tutors" to its software offerings. Courseware is likely to end up developing programs in Lisp and then re-writing them in Pascal for runtime versions on personal computers, Kearsley said.

Work so far has concentrated on studying expert systems written for larger machines and then moving the software to micros, using a variety of tools. Among the AI languages used, "Golden Common Lisp was the best implemented and the best supported," he said. "It had the best code, ran the fastest and had the most complete functions."

David Touretzky, a research associate in the Computer Science department at Carnegie-Mellon University in Pittsburgh and author of a popular Lisp textbook, emphasized training rather than development. Gold Hill "probably has [created] the best introductory programming environment that I've ever seen," he said.

Ideal for teaching languages

"Lisp is the ideal language for teaching languages to humanities students," Touretzky maintained. Beginning this September, Golden Common Lisp will be doing exactly that, running on classroom micros at the university as part of an introductory computer science course.

Although the software "is not a full Common Lisp implementation," it is the closest microcomputer equivalent, Touretzky said. "It has a nice programming editor," he added. "The windowing is fairly crude, but it is there — they made a reasonable trade-off." He also praised the ability to call up on-line documentation while continuing to type in functions.

Touretzky did criticize Gold Hill for bundling a Lisp tutorial with the program, saying that many users might prefer to buy the program alone.

However, Bruce Johnson, partner in charge of AI worldwide at Arthur Andersen and Co. in Chicago, gave the tutorial good marks. Arthur Andersen uses the program primarily as a teaching aid, he said. "We're a large, distributed organization, and

it's important to have people get some training before they come to our AI centers."

First shipped in November 1984, Golden Common Lisp costs \$495 and includes an interpreter, editor, tutorial, on-line Help, a Lisp textbook and a Common Lisp reference manual. It requires 512K bytes of random-access memory and IBM's PC-DOS 2.0.

Eugene Wang, Gold Hill marketing vice-president, said the firm will deliver a second release of Golden

Common Lisp, with a lexically scoped interpreter, in November. A compiler, priced at \$495, is also scheduled for November shipment.

Additionally, a \$695 native-mode version for Personal Computer AT-class machines that can address up to 16M bytes of memory will be available in December, Wang said. Users agreed that the large-memory software could make the AT particularly attractive as a low-cost Lisp development machine.

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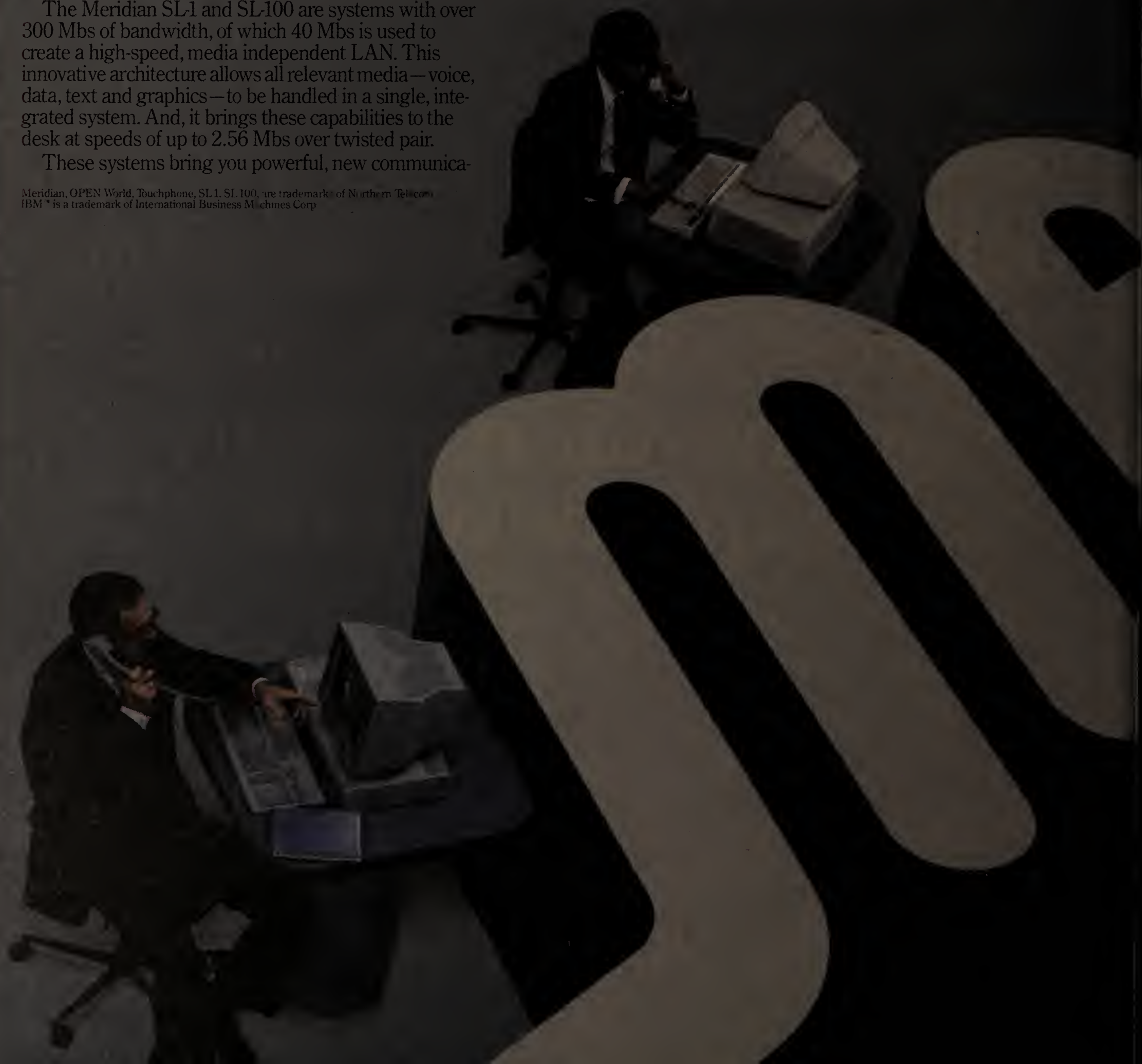
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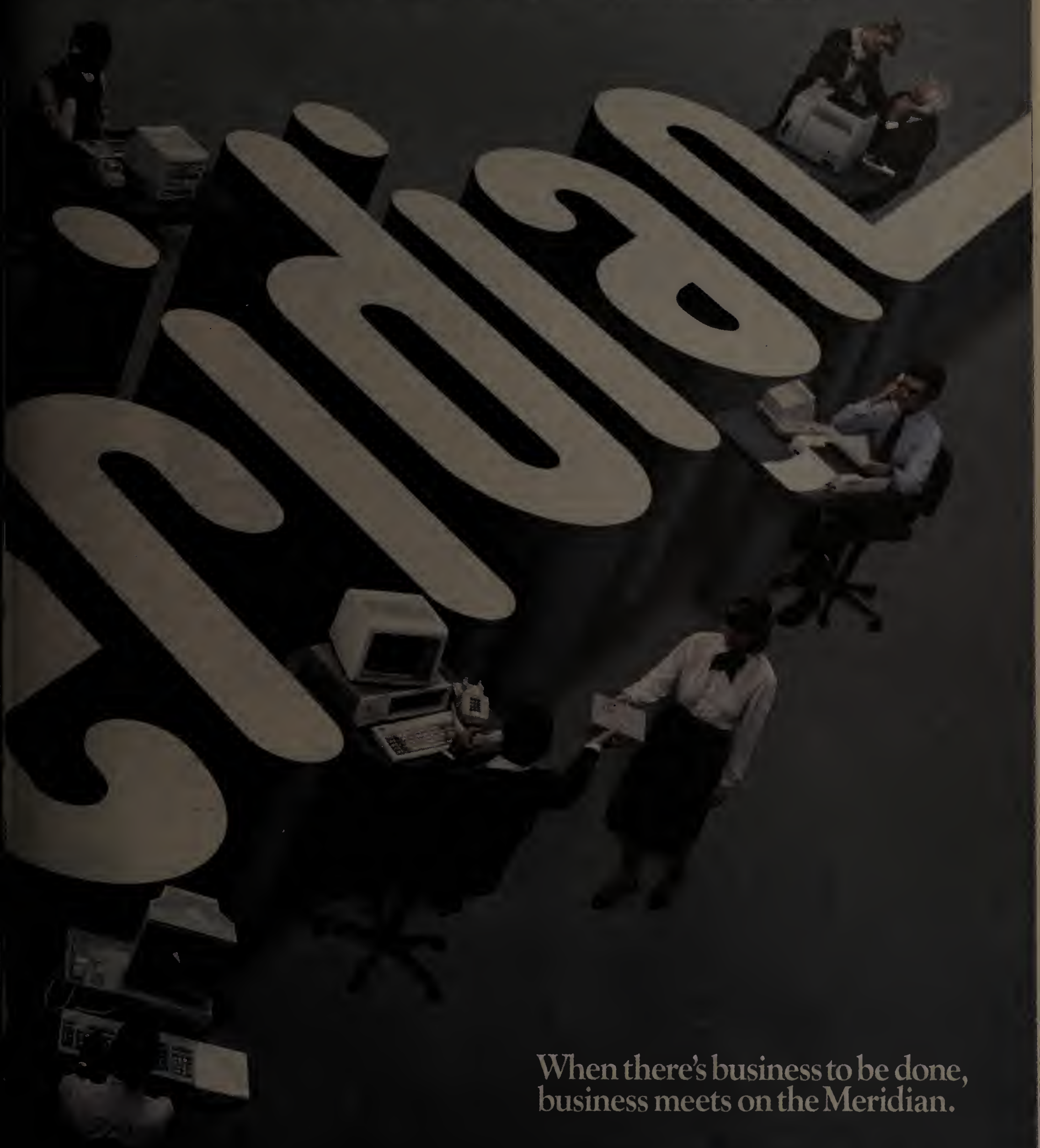
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MICROCOMPUTERS

SOFTWARE from page 56

■ **The Cadware Group, Ltd.** has announced computer-aided design and engineering software that is said to allow users to create and manipulate icons for layouts and designs on the IBM Personal Computer, Personal Computer XT and AT.

The Design Graphics Software (DGS) system is said to track interactively and detect any design errors based on the design rules established by the engineer during the icon definition stage. The DGS user interface operates via a mouse-controlled cur-

sor, the vendor said.

The DGS system requires 640K bytes of main memory, 10M bytes of hard-disk capacity and a high-resolution monochromatic bit-map graphics controller.

The single-unit cost for the software, including mouse and documentation, is \$3,500.

The Cadware Group, 869 Whalley Ave., New Haven, Conn. 06515.

■ **The MacNeal-Schwendler Corp.** has released an interactive program that is said to automate the

solution of equations used frequently in structural and mechanical engineering applications for use on the IBM Personal Computer and compatibles.

The MSC/Case program, developed by DVSE, Inc. of North Haledon, N.J., is said to have a data base that contains solutions to problems used in all phases of engineering analysis and design.

The program is said to contain the following five basic problem types: geometric and material properties; beams and columns; rings, cables, arches and frames; plates, shells and

pressure vessels; and natural frequencies.

It also includes equation solutions for various stress problems. Users may append their own special-purpose programs to MSC/Case, the vendor said.

The software requires 192K bytes of random-access memory.

The package costs \$895, with an introductory price of \$595 available for the 90 days after first shipment, which should begin on July 1, the vendor said.

MacNeal-Schwendler, 815 Colorado Blvd., Los Angeles, Calif. 90041.



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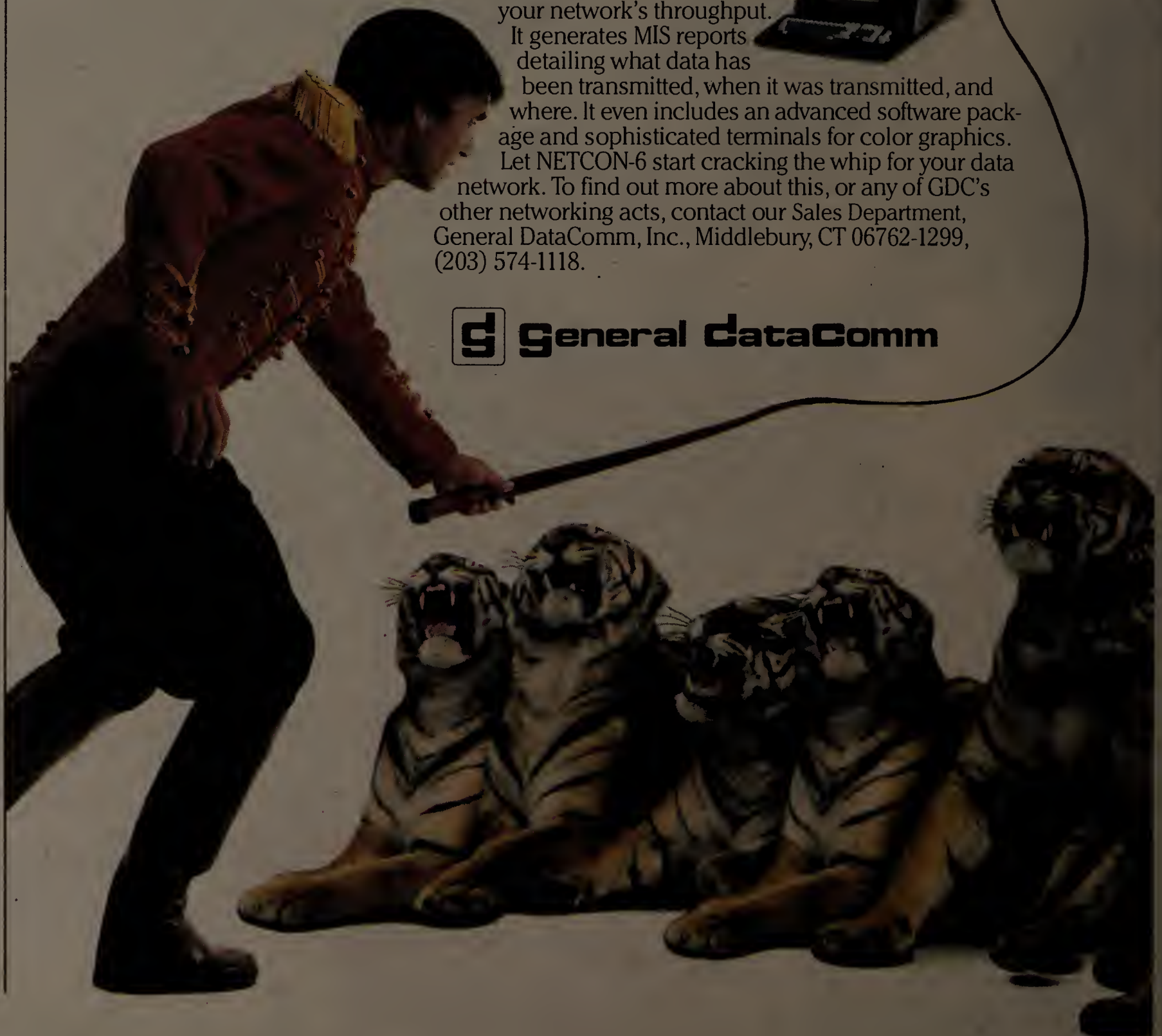
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General dataComm



MICROCOMPUTERS

JAZZ from page 53

sheet, create a chart from that information and paste the chart into a word processing document. Then, if the user wants to change the numbers in the spreadsheet to reflect different conditions, they will be automatically updated in both the chart and the word processing files. This is a very slick utility, and it will be used often in businesses that have high-volume processing needs.

Jazz includes the following modules, which by themselves are fairly solid:

■ The spreadsheet is extremely powerful, offering more than 100 mathematical, financial and statistical functions, as well as a number of time and date stamps and calculations. The module is easy to use, and the user can perform tasks by pointing the mouse, using a menu or the keyboard. I created a

”

The official Lotus position has been that macros are not necessary due to the ease of use the Jazz and Macintosh interfaces offer.

1,000-row by 20-col. work sheet and experienced no memory problems or lags in recalculation time.

The spreadsheet does not, however, offer any macro functions, which has caused much consternation. The official Lotus position has been that macros are not necessary due to the ease of use both the Jazz and the Macintosh interfaces offer, although company sources indicate that Jazz will have a macro capability in a future release.

Aside from the lack of macros, the 1-2-3 user would seem to feel at home here. One nice feature of Jazz is the ability to convert 1-2-3, Symphony and Microsoft Corp. Multiplan files to Jazz spreadsheet files. One hitch is that once they are in the Jazz format, files cannot be converted back. Lotus has promised this enhancement for Jazz.

■ The graphics module works hand in hand with the spreadsheet. To create a graph of data, one only has to define the range of cells desired, copy them to the Clipboard, open a new graphics file and “paste” them into that document. Once the values are in the chart, the user can choose from a variety of chart and plot types. Embellishing the chart with text, headers, footers and the like is very simple. A finished chart can

be printed on its own or pasted into a text file and printed as part of a report.

■ The word processing module is vanilla — no indexing, special margin or multicolumn text options — but it should do the job for most average office uses. It is almost a carbon copy of Apple's Macwrite, though it does offer a few enhancements, such as Hotview, a backward search and time-, date- and page-stamping features.

Memory availability was a problem. I frequently was unable to perform a search or to cut and paste text due to insufficient memory. While I never lost any data, in order to continue I had to close all open files on my screen. One time I received the insufficient memory message when the document was the only open file.

■ The data base and forms generation module is also very basic and not at all

See JAZZ page 64

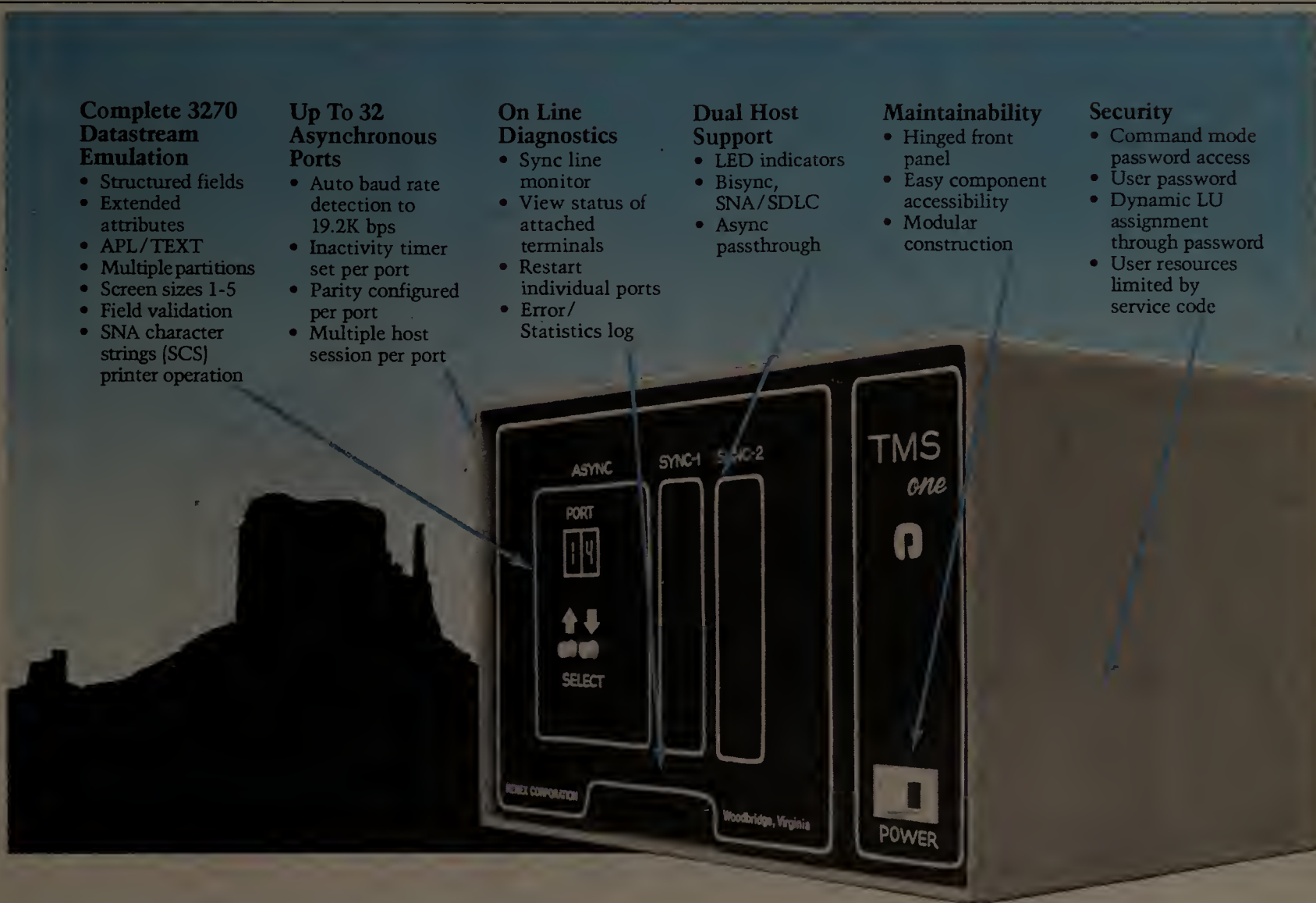
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MICROCOMPUTERS

JAZZ from page 63

suited to high-powered reporting. It offers sort and query facilities that are quick (a 2,000-record sorted on three categories in under 10 seconds) and you can use relational operators to find records. This module could be used effectively for a small (fewer than 4,000 records) data base, but any user who needs a data base that offers linked records and high storage capacity

should look elsewhere.

The reporting facility is not as user-friendly as are the other modules. In creating a basic report, it took four tries before I got what I wanted.

■ The communications module again offers basic functions that the average user would need but that a more advanced user might feel stymied by. Users can send and receive files via another computer or an information service.

I was unable to hook into the Compuserve network. It seems that Jazz has a problem with control sequence characters, and Compuserve requires a Control-C to log on. Aside from that, almost all of the parameters are variable — bit/sec. rate, stop bits, terminal emulation and protocol, for example.

Some misgivings about Jazz include the following:

■ Any user who plans to use Jazz with frequency should get a hard disk drive.

Jazz is billed as a program for a 512K Macintosh with an external floppy drive, though when I used Jazz with this configuration, I found access times and program response times very high. The program takes up huge amounts of space, both in the system and on a disk, and requires a fair amount of disk swapping when storing data files. When Jazz was installed on a hard disk, the speed picked up to the point where calculations and oper-

ations were extremely quick.

A related point is that the instructions for putting Jazz on a hard disk are confusing and very short.

While the documentation is generally excellent, the main handbook does not offer any real troubleshooting help. If you have a problem or get a cryptic error message, your only hope is a toll call to Lotus' Jazz support line. The support personnel have been courteous and helpful, but they will be very busy if any serious problems come up.

Jazz is copy protected and, while a backup disk is provided, a program disk must be kept in the disk drive. The possibility of a new user or a power glitch accidentally erasing the disk

”

The support personnel have been courteous and helpful, but they will be very busy if any serious problems come up.

does not sit well with me. The only recourse in such a case is to send the disk back for a replacement, which is free during the 90-day warranty period and costs approximately \$25 thereafter.

Impressive software

Jazz is a very impressive piece of software. Almost all of the major bugs seem to be cleared out of the package, and I was able to crash Jazz only twice — both times when using the communications module and a hard disk.

Jazz's communications module defaults to the modem port, which some hard disks use as the connection to the Macintosh. Users can change a file so that it uses the printer port as the modem port, but they cannot change the default. This is more of a Macintosh problem than a Jazz problem.

In terms of integration, Lotus has done a very nice job. Hotview allows almost all data on open files to be updated, and the feature can be turned off as easily. Switching between files and modules also is simple. Lotus deserves praise for the simplicity of the interface — everything can be called up via menu choices regardless of the module being worked on. Going from one open file to another is not instantaneous, but it is generally quick.

Lotus claims to have conducted a great deal of research into integrated software and states that Jazz is its answer to the office worker's needs. This could very well be true. Time and sales will tell.

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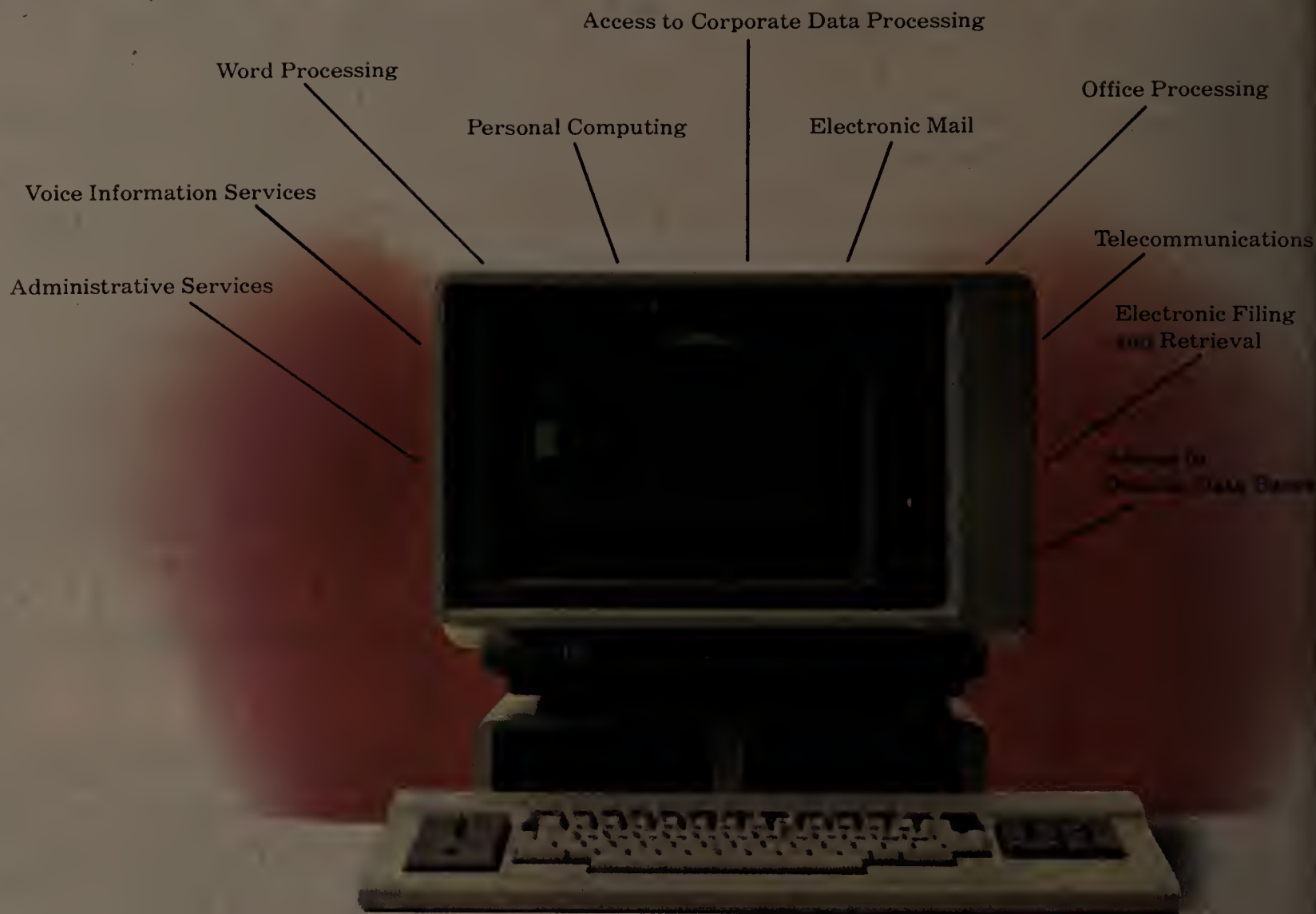
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COMMUNICATIONS



DATA STREAM

John Dix
CW Senior Editor

Will networks tell Big Brother all?

The Orwellian concept of Big Brother has been beaten to death, but developments in communications merit pulling the metaphor out of the attic for yet another flogging.

Over the last several years the general public has become more aware of privacy breaches that are being made possible through the common use of computers and communications.

For now, most people are indifferent to the information that, for example, large credit authorization companies can amass regarding personal data such as how much you spent where and on what. This is indicative of a blind — most would say necessary — trust we have in these institutions.

Credit authorization is only the most visible spot of vulnerability. Thankfully, in the documented cases of abuse the villain is not the network or service operator nor typically associated with government. But consider the growing number and type of networks and how vulnerability grows proportionally.

Financial institutions and their networks can provide a wealth of personal information. Beside tallying monthly transactions, the banks track movement with records of where, when and how much money customers remove from automatic teller machines. Their tentacles reach across the country as participants in credit card organizations, tirelessly tracking and logging data on where people stay, where they eat and what type of entertainment they prefer.

The advent of the smart card — credit cards outfitted with memory circuitry that can store whatever the issuer may wish — will exacerbate the situation, serving as color- and number-coded tags stapled to our ears like those used to study wild animals "for their own good."

The gaps in the reach of standard bank revolving credit card accounts are already

See **BROTHER** page 69

Racal-Vadic introduces statistical multiplexer

MILPITAS, Calif. — Racal-Vadic, Inc. has introduced a four- or eight-channel asynchronous statistical multiplexer that can reportedly be used with leased or dial-up lines.

The 7400 Series Statistical Multiplexer is available stand-alone or with an internal 4.8K bit/sec. or 9.6K bit/sec. leased-line modem or a 2,400 bit/sec. dial-up modem.

Both the four- and eight-channel device reportedly can support channel speeds of up to 9.6K bit/sec. over a 2,400 bit/sec. dial-up link when outfitted with that modem option. This is made possible with the use of buffers and because of the inherent idle time associated with asynchronous devices, according to Racal-Vadic product manager Ric Clanin.

"Data comes in at 9.6K [bit/sec.], is stored and [is] clocked out at 2,400 bit/sec.," Clanin said.

The 2,400 bit/sec. modem autodial the line when a port user hits a return key and takes the link down after a predetermined amount of idle time.

Users with heavier demand can outfit the 7400 with an internal 4.8K bit/sec. or 9.6K bit/sec. leased-line modem. Both of these modems have a dual-dial back-up capability whereby both modems call each other if the leased circuit goes down. The devices automatically switch back to the leased link when it is restored.

Another 7400 option is the Help module. See **RACAL** page 69

■ RAD Computers has announced a miniature two-channel time division multiplexer with a built-in short-haul modem/68

■ NCR Comten recently unveiled a release of its Comten X.25 Interface to Packet-Switched Data Networks/68

■ American Photonics has introduced a multiplexer that combines 24 RS-232 channels over a fiber-optic link at distances up to 10 kilometers, or with optional wire output, over T1 metallic circuits/68

INI announces VLSI chip set

SANTA CLARA, Calif. — Industrial Networking, Inc. (INI) has developed a very large-scale integration (VLSI) chip set that meets General Motors Corp.'s Manufacturing Automation Protocol (MAP) specifications for factory networks.

The two-chip set works with Cmos gate-array technology and is said to be compatible with Level 1 and Level 2 of the IEEE's 802.4 token-passing bus standard. These levels define standard physical and data link layers for a local-area network.

The chip set will be used by INI in its MAP products and will not be sold separately, the company reported. INI will supply Intel Corp., Motorola, Inc. and GM with MAP components and systems.

INI is a joint-venture company formed by Ungermann-Bass, Inc. and General Electric Co.

Ultimate's Ultinet out

EAST HANOVER, N.J. — Ultimate Corp. has announced Ultinet, a network system for its family of minicomputer systems for data base management.

Ultinet is said to enable Ultimate data base systems — which consist of a coprocessor, proprietary operating systems and either a Digital Equipment Corp. or Honeywell, Inc. computer — to be interconnected with local-area networks, wide-area networks or public data networks through gateways.

Based on the International Standards Organization's Open Systems Interconnect architecture, Ultinet is said to support communications through Ethernet-type local networks, the High-Level Data Link Control protocol and GTE Telenet Communications Corp. and Tymshare, Inc.'s Tymnet. See **NETWORK** page 68

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Modems/68

Local-Area
Networks/69

Test Equipment/69

Oracle announces portable version of IBM SQL/DS and DB2

Any application written for IBM's SQL/DS or DB2 relational database management systems will now run without modification on DEC, DG, AT&T, HP and several other manufacturers' minis, and a wide range of micros, including the IBM PC/XT and PC/AT.

Oracle Corporation introduced the first relational DBMS in 1979. Today ORACLE is the only relational database management system that is completely compatible with IBM's SQL/DS and DB2. Programs written for SQL/DS or DB2 will run unmodified on ORACLE.

Originally designed for IBM mainframes and DEC superminis, ORACLE is now available on a wide range of machines, from mainframes to PCs. And ORACLE includes an integrated set of 4th generation software tools not available with either SQL/DS or DB2.

■ **Why not Cullinet, ADR or Focus?** There is a clearly defined standard for relational database systems. It's called SQL, and it's from IBM. Both ANSI and the US Government are in the process of adopting SQL as the standard database language. The Cullinet, ADR and FOCUS software packages each implement their own unique database language — each one painting the user into

its own corner. Since its inception, Oracle Corporation has provided total IBM SQL compatibility.

Few shops nowadays run only IBM mainframes. Why, then, even consider a database solution that runs *only on IBM mainframes*? Applications written with ORACLE run identically on mainframes, minis, and PCs. Because all versions of ORACLE are identical.

FOCUS, Cullinet and ADR offer either a limited subset, a completely different product or nothing at all (respectively) for the PC. And none have minicomputer products.

■ **Why not just go with DB2 or SQL/DS?** A relational DBMS simplifies but does not by itself eliminate application programming. Additional tools are necessary if users are to create and maintain their own applications.

DB2 and SQL/DS are relational systems, period. ORACLE is a relational DBMS plus integrated 4th generation software tools for application generation, report writing, color graphics and network communications.

Furthermore, SQL/DS and DB2 run only on IBM mainframes (and are somewhat unlikely ever to run on another vendor's system). ORACLE runs on more IBM hardware

and operating systems than do IBM's relational products.

■ **What about Goldengate, dBase III, Symphony or Framework?** PCs need more than PC software if they are to be usefully integrated with corporate data processing. Incompatibility with SQL, while serious, is not the only major problem with these micro packages. None provides an acceptable level of data security, integrity or recovery facilities. And their PC-to-mainframe links are functionally primitive and difficult to use.

To effectively link computers, all machines in the network should run the same software. Only ORACLE provides standard software on mainframes, minis and micros. Data and programs can then be shared among users of different machines, distributing the workload.

ORACLE is currently installed on over 1000 mainframe and supermini systems around the world, as well as on thousands of PCs. Oracle's customers include 8 out of the 10 largest U.S. corporations, as well as major foreign companies and government agencies.

For further information, contact Oracle Corp., Dept. C2, 2710 Sand Hill Rd., Menlo Park, CA 94025, or call 415/854-7350 ext. 1060.

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COMMUNICATIONS

CONTROLLERS

■ **MDB Systems, Inc.** has announced a communications controller for Digital Equipment Corp. Uni-bus-based systems that is said to support up to 256 users and provide the asynchronous capacity of 16 DEC DHU11 controllers.

The MDB-DHU-A32 runs under DEC RSX11-M, RSX11-M Plus, RSTS/E and VMS operating systems. The controller is said to offer better performance than DEC DZ and DH11 controllers because of its capability to switch between direct memory access (DMA) and programmed I/O silo mode. Short messages are sent directly via programmed I/O mode, where there is no DMA setup time involved, while longer messages sent via DMA are not broken up, the company said.

The board supports slave boards through a parallel bus interface. This bus interface uses dual 34-conductor I/O cables to interconnect up to 16 slave boards that can be located at distances up to 1,000 ft, the vendor reported.

The MDB-DHU-A32 costs \$3,200.

MDB Systems, Box 5508, 1995 N. Batavia St., Orange, Calif. 92267.

■ **NCR Comten, Inc.** has announced a version of its Comten X.25 Interface to Packet-Switched Data Networks, a software product that is said to provide features equivalent to IBM's NCP Packet-Switching Interface (NPSI) Releases 3.1 and 4.0.

The Comten NPSI module is said to offer an optional module that enables users to access applications programs designed for IBM's NPSI.

The product consists of a number of parts that carry yearly license fees: Basic X.25 Network Interface with a fee of \$3,300, Network Administrative Profiles with a fee of \$528, NPSI Packet Adapter with a fee of \$1,045 and Extra Capability Modules with a fee from \$1,650 to \$3,520.

NCR Comten, 2700 Snelling Ave. N., St. Paul, Minn. 55113.

ment Corp.'s VAX processors to access Western Union's Easylink electronic mail and telex network.

Developed by Alisa Systems, Inc., the Alisa Connection provides two-way communication between VAX electronic mail system and Easylink.

Message delivery options include an Easylink mailbox, Mailgram messages and Express Document.

The Alisa Connection costs \$1,850 per Easylink account.

Western Union, One Lake St., Upper Saddle River, N.J. 07458.

ber-optic link at distances up to 10 km, or, with optional wire output, over T1 metallic circuits.

The AFM2320 can be daisy-chained together to provide multi-drop or modified drop-and-insert capabilities that enable intermediate nodes to be recognized or bypassed, the vendor said.

On the channel side, the device is said to accept up to three duplex data channels per conductor, or combinations of data and control channels such as one data channel and two control channels.

The product supports asynchronous data transmission at speeds up to 19.2K bit/sec.

The multiplexer costs \$1,500, the vendor said.

American Photonics, P.O. Box 289, 71 Commerce Drive, Brookfield Center, Conn. 06805.

SOFTWARE

■ **Western Union Corp.** has introduced communications software that enables users of Digital Equip-

MULTIPLEXERS/
MODEMS

■ **American Photonics, Inc.** has introduced a multiplexer that combines 24 RS-232 channels over a fi-

Multiplexer with built-in modem unveiled

RAD Computers, Inc. has announced a miniature two-channel time-division multiplexer with a built-in short-haul modem.

MMM is said to support either asynchronous or synchronous full-duplex transmission. Each channel operates at speeds up to 19.2K bit/sec. in synchronous mode or 9.6K bit/sec. in asynchronous mode. Link speeds range up to 38.4K bit/sec. over four-wire cable at distances up to five miles.

The integral modem is synchronous and works with Eurocon D1 modulation. It features transformer isolation that provides lightning protection and blocks out noise.

The unit weighs 7 oz and costs \$350.

RAD Computers is located at 40 N. Van Brunt St., Englewood, N.J. 07631.

NETWORK from page 67

packet networks.

The gateways are said to support file transfer and terminal emulation capabilities.

A network management package enables a user to configure a system, perform network diagnostics and obtain performance statistics.

Ultinet costs approximately \$28,000 per network CPU.

Ultimate is located at 717 Ridgedale Ave., East Hanover, N.J. 07936.

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COMMUNICATIONS

LOCAL-AREA NETWORKS

■ Bridge Communications, Inc. has introduced a modem for broadband local networks that reportedly supports High Level Data Link Control (HDLC), Synchronous Data Link Control (SDLC) and bisynchronous protocols.

The synchronous Model 316 Broadband Modem supports point-to-point or multidropped connections on two-way coaxial cable nets at speeds up to 56K bit/sec. Up to 20 simplex or 10 duplex channels can be operated in each 6 MHz broadband channel, the vendor reported. The product's frequency-agile design enables the transmitter or receiver to operate at any of 20 300-KHz subchannels.

The modem's biphase data encod-

ing provides protocol transparent transmission. An on-board micro enables link testing with remote loop-back in-band signaling and local loop-back. The product costs \$1,795.

Bridge Communications, 1345 Shorebird Way, Mountain View, Calif. 94043.

■ Cabletron has introduced TDR 5000, a portable device that tests coaxial connections on a local-area network.

The product, a time-domain reflectometer, checks a network's coaxial cables, connections and taps. The product employs a negative pulse technique that tests faults on base-band or broadband networks. When testing with negative impulse, base-band networks can be tested while idle.

The product works with a number of networks including those from Applitek Corp.; Digital Equipment Corp.; Wang Laboratories, Inc.; Bridge Communications, Inc.; Corvus Systems, Inc.; Excelan; Interlan, Inc.; Sytek, Inc.; Ungermann-Bass, Inc.; Xerox Corp.; and 3Com Corp., the vendor reported.

TDR 5000 costs \$4,500.

Cabletron, 198 Pleasant St., Ashland, Mass. 01720.

TEST EQUIPMENT

■ International Data Sciences, Inc. has introduced its 5000 series of network test equipment.

The series consists of the Model 5100 hand-held data communications test set, the Model 5200 multispeed

data communications test set and the Model 5300 data network/protocol analyzer.

The products can be used separately or in concert, according to the vendor. For example, a Model 5300 can transmit software over an asynchronous link to a Model 5100 or a Model 5200. Test results can be sent back to a Model 5300 where they can be analyzed.

The test equipment is said to provide a number of functions including testing of low- and high-speed error rates, trap and monitor transmission and polling. Each product has an RS-232 remote control port that allows test software and results to be transmitted to various locations.

Product prices range from \$895 to \$3,995.

International Data Sciences, 7 Wellington Road, Lincoln, R.I. 02865.

RACAL from page 67

dem, an AT&T 103-type diagnostic modem with autodial and answer capabilities. This modem reportedly calls a preset telephone number to report problems.

The 7400 reportedly enables all channels to be prioritized and provides both in- and out-band flow control. Configuration is said to be performed though software.

The basic four-channel 7400 costs \$1,295. The 2,400 bit/sec. modem option costs \$995, the 4.8K bit/sec., \$1,100, and the 9.6K bit/sec., \$1,550. The Help modem costs \$165.

Racal-Vadic is located at 1525 McCarthy Blvd., Milpitas, Calif. 95035.

BROTHER from page 67

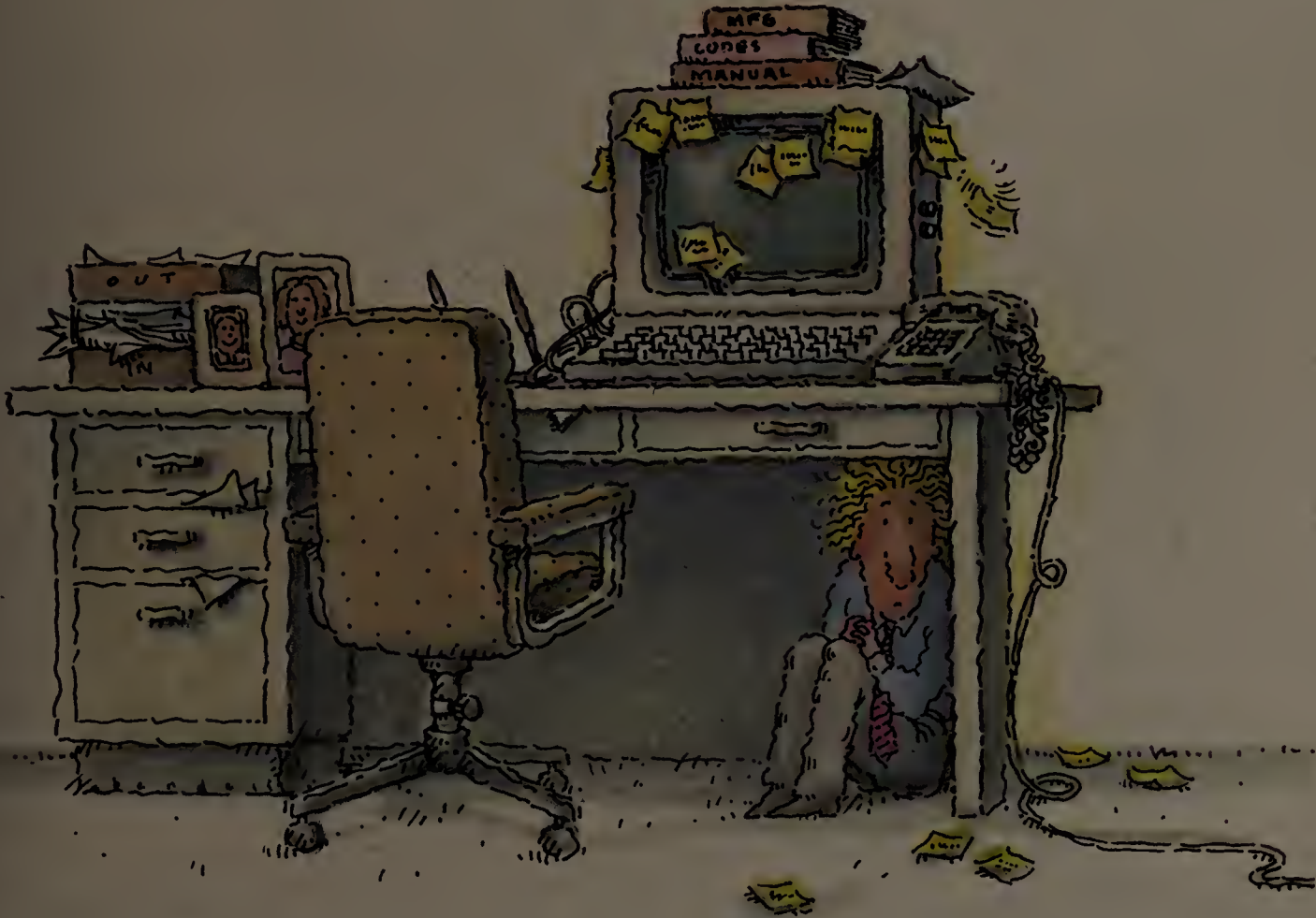
filled in by such things as retail and gasoline company credit cards. Now some of the nation's largest retailers — many of which are conglomerates controlling such things as banks and real estate firms — offer transaction processing services to other companies. The retailer's power as information controller is further strengthened by the fact that many chains also accept payments for utilities.

Telephone companies also collect reams of data. Beside the monthly bills outlining places called, call holding times might indicate use of telecommunications facilities for computer use. Travel is documented through use of calling credit cards and records document use of mobile telephones. When you're not on your phone, Big Brother might be peering into your home by monitoring the use of cable TV.

All these points of vulnerability presume that a malicious entity is waiting to exploit them. Perhaps an even more ominous threat is the idea of that entity being a machine — a machine that gathers information and calls other machines to deposit the cache.

While nonthreatening, it may be telling that some soda machines are now equipped to call the distributor who services them and report when they need filling or when they are damaged. On a higher plateau, IBM's recently announced 3090 processor series is said to be capable of automatically calling IBM service representatives to report problems.

Couple this capability with the networks outlined above and you can come up with a rather chilling scenario.



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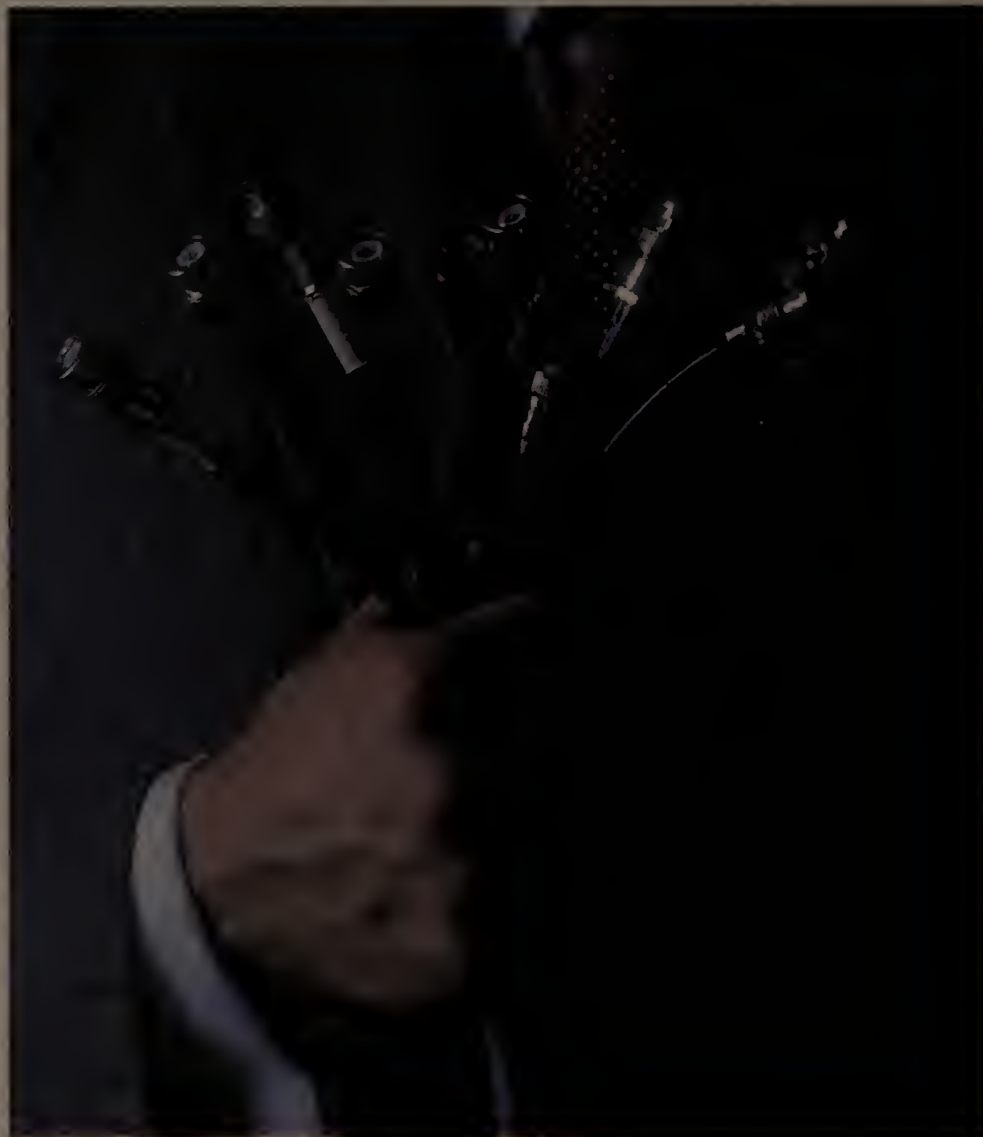
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SYSTEMS & PERIPHERALS

DEC unveils single-user workstation

Ada machine enhances program development

MAYNARD, Mass. — Digital Equipment Corp. has announced a single-user development workstation system for Ada language programmers.

The Ada Programmer's Vaxstation II, which runs under DEC's MicroVMS operating system's workstation version, allows users to develop programs with the government-validated VAX Ada compiler. The machine is a special configuration of the Vaxstation II workstation, the company said.

The workstation is said to operate as a stand-alone system or can be networked to other VAX-based computer systems. It features an editor, networking capabilities, windowing capabilities and a 1,024-by-864-pixel resolution monitor, the vendor said.

A configuration consisting of a Microvax II system with 3M bytes of memory, expandable to 9M bytes; a 71M-byte Winchester disk drive; a ½-in. streaming tape cartridge; a 19-in. monochrome terminal with a three-button mouse; a keyboard; a Decnet/Ethernet interface; and associated network software costs \$39,300. It includes licenses for the MicroVMS operating system's workstation version, the VAX Ada software, the VAX Graphic Kernel System package, the VAX Language-Sensitive Editor and the Decnet end-node software.

Additional information is available from DEC, which is located in Maynard, Mass. 01754.

Ridge Computers adds four Risc processors

SANTA CLARA, Calif. — Ridge Computers added four processors to its line of reduced instruction set computer (Risc) systems that are aimed at computationally intensive tasks.

Called the 32/110, 32/130, 32/310 and 32/330, the units differ in terms of size, the number of users supported, the number of peripherals that can be attached and the amount of main memory, the company said.

The 32/110 features the company's standard CPU, a 78M-byte disk drive, a 1M-byte floppy disk drive, 4M bytes of main memory and four expansion slots. It costs \$39,000.

The 32/130 comes in the same basic cabinet as the 32/110 but includes a 150M-byte disk drive, a 1M-byte floppy disk drive, 4M bytes of main memory and four expansion slots. The unit also includes an enhanced CPU, which is said to improve execution of floating-point instructions by 100% to 300%. The system costs \$47,000, the vendor said.

The 32/310 includes a 150M-byte hard disk drive, a 1M-byte floppy disk drive, a standard CPU, 4M bytes of main memory and nine expansion slots. It costs \$56,000.

Ridge's top-of-the-line 32/330 includes 8M bytes of main memory, a 150M-byte hard disk drive, 1M-byte floppy disk drive, eight expansion slots and the CPU

See RIDGE page 75

■ Competitive Computer Systems unveiled two supermicros based on National Semi's 32016 microprocessor/74

■ System Industries introduced a band printer for DEC PDP-11 and VAX series processors/75

■ Digi-Data announced a tape subsystem that offers a serial communications link between RS-232 ports and IBM-compatible tape drives/75

INSIDE

Processors/74

Graphics Systems/74

Data Storage/75

Terminals/75

Printers/Plotters/75

Parallel Computers introduces two Unix-based mini models

SANTA CRUZ, Calif. — Parallel Computers has taken the wraps off a pair of minicomputers, based on redundant, self-checking architecture, that use the AT&T Unix operating system.

The 300 Extended Reliability (XR) series, composed of the Model 30 and Model 40 machines, has duplicate CPUs, memory, disk subsystems and power supplies so that if a component fails, its twin maintains operation, the vendor said. The computers are said to be safe from external power problems by uninterruptible power supply systems.

The Model 30 supports eight users and has 1M byte of main memory, an 84M-byte hard disk drive and a ¼-in. streaming tape

drive. It costs \$59,900.

The Model 40, which costs \$74,900, supports 16 users and has 2M bytes of main memory, 168M bytes of hard-disk storage and the ¼-in. streaming tape drive.

Both machines can be expanded to support 32 users. A five-year warranty costs \$9,000. The previously released 300 family can be field upgraded to the 300 XR series and is then eligible for the warranty.

Additional memory is available in increments of 1M byte, 2M bytes and 4M bytes per processor, as it is a dual-processor system, and the memory costs \$8,600, \$16,200 and \$30,400, respectively.

Parallel Computers, 3004 Mission St., Santa Cruz, Calif. 95060.

Survey predicts IBM 3080 demise

FRAMINGHAM, Mass. — Despite its claims to the contrary, IBM may soon lay its 3080 line of mainframes to rest. According to a market research firm here, if IBM extends its midsize 4381 line upward to the 12 million instructions per second (Mips) range and announces a low-end version of its 3090 processor operating in the 14-Mips to 15-Mips range, the 3080 series machines could be squeezed from the market. (Last week, IBM announced a 6% price reduction on its 3080 base model and Model X machines.)

International Data Corp. (IDC), in its Quarterly Residual Value Memo for the second quarter of 1985, noted that at present, used 3080 machines are in short supply. Current fair market values for 3080 machines as of late March ranged from 60% of their list value for the 3081 Model D to 70% for the 3084 Model Q. Inexpensive imports of the 3080s that had been coming over from Europe have ceased, and user installation of additional 3080 machines to meet current performance requirements have caused the prices on used 3080s to rise somewhat, the report stated.

Users of 3084 Model QX machines seeking more power will either have to invest in the \$6 million 3090 Model 200 or turn to the used 3081 Model K and 3084 Model Q market for their purchase or lease alternatives, the report said. The 3081 Model K user must weigh the cost advantage of a 3084 upgrade against how quickly his performance

needs are growing.

There will also be a lot of activity in the market for used 4381 machines. IDC said that 30.6% of the superminicomputer users surveyed expect their processing power to grow from 26% and up through 1987. A secondary market for 4381s has developed, with machines coming over from Europe as a result of the exchange rate. With 4381 Model 3s due to ship this quarter, the 4381 will continue to be the mainstay of IBM's mid-range systems for some time, the report said.

Spark in 4341 market

The higher end 4341 market continues to show some spark, the report said, because users realize the bargain prices these machines currently have. Any upturn in the 4341 marketplace will be short lived, as the machines are not upgradable. Demand for used 4331 and 4361 machines is sluggish.

In the used IBM disk product market, the older 3380s show a fair market value of 88% of their IBM list price. There is not an abundance of these units on the market, the report said. This disk drive is still a product worth considering, even though the old units are not upgradable to the 3380 AD4s, BD4s, AE4s and BE4s, IDC said. Current fair market value for the 3380 Model 1 controllers is in the low 70% range, while the Model 3s are around 80%, the report stated.

See 3080 page 74

Plexus announces supermicro system

SAN JOSE, Calif. — Plexus Computers, Inc. has released its Plexus P/20 supermicro that incorporates dual Motorola, Inc. 68010 microprocessors, a small computer systems interface (SCSI), an Intel Corp. Multibus interface and the AT&T Unix System V Release 2.0 operating system.

The machine, which costs \$10,950 in single quantities, is part of the Plexus P/15 family and is said to be suited to office automation, transaction processing and industrial applications. The system's SCSI bus will accept up to seven storage devices, including 142M bytes of Winchester hard-disk storage. The Multibus permits addition of an eight-serial-port controller board to provide up to 16 serial ports, the vendor said. The board costs an additional \$3,450 in single quantities and \$2,070 in OEM quantities, a spokesman said.

The dual-processor architecture incorporates a job processor and a supplementary direct memory access controller for I/O, the vendor said. Both processors access the same block of memory.

The eight-user P/20 system, with a 24M-byte hard disk, 1M-byte unformatted floppy disk and 512K bytes of memory, costs \$10,950 in single quantities and \$6,025 in OEM quantities.

More information is available from Plexus Computers, 3833 N. First St., San Jose, Calif. 95134.

SYSTEMS & PERIPHERALS

PROCESSORS

■ **Competitive Computer Systems, Inc.** has released two supermicrocomputers based on National Semiconductor Corp.'s 32016 chips, which provide a 32-bit environment with demand page virtual memory and a floating-point processor.

Both systems use an Intel Corp. Multibus interface and National Semi's Genix operating system. The Series I machine comes with 1M byte of random-access memory (RAM), a 40M-byte hard disk drive and a 1M-byte, 5¼-in. floppy disk drive for backup.

The Series II multiuser machine (for up to 12 users) features a 300M-byte hard disk drive and a Pertec Computer Corp. ½-in. streaming tape backup. It has 1M byte of RAM and a serial board hooked to 12 serial ports. It comes with Genix, C and Fortran compilers.

Options available include added tape backup, ports, terminals and hard-disk storage.

The Series I costs \$17,995, and the Series II costs \$39,500.

Competitive Computer Systems, Suite 211, P.O. Box 269, 48 W. Chestnut St., Lancaster, Pa. 17603.

GRAPHICS SYSTEMS

■ **Perkin-Elmer Corp.** has announced that the Tektronix Corp. family of computer graphics products is now available to users of its Series 3200 superminicomputer.

The Tektronix applications range from text editing to computer-aided design and manufacturing. The Tektronix 4100 and 4110 series display terminals feature high resolution, color and local graphics segment manipulation. Color graphics copiers are available for both terminals.

The 4695 copier functions as both a hard-copy device and dot matrix character printer, the vendor said. The 4691 copier, compatible with the 4113 and 4115 terminals, is said to produce copies for up to four terminals concurrently. The Tektronix Plot 10 software reportedly provides a set of tools for developing graphics applications on Tektronix terminals.

Prices for the Tektronix graphics packages range from \$3,995 to \$22,950, depending on module quantity. The color graphics copiers range in price from \$1,595 to \$12,950. The Plot 10 interactive graphics library costs \$4,000 to \$18,000, and the Plot 10 terminal control system costs \$2,000.

PE, Data Systems Group, 2 Crescent Place, Oceanport, N.J. 07757.

3080 from page 73

The market for IBM 3350 disk drives may disappear within the year, the report said. There is an abundant supply of 3350s, and their fair market value is around 10% of retail.

The 3370 A1 and B1 information shows that the product is in demand. The A1s are at 55% of fair market value. The 3370 boom may be experiencing positive backlash from 4300 user demand, the

report said. Values of the 3375 disks were up to approximately 70%, probably because of the lack of 3380s on the market.

IBM 3480 tape drives are starting to hit the street, creating a surplus and driving current fair market values down, the report said. The 3420 Model 4 is fading fast. It goes for about 35% of the list price for single-density machines and 40% for dual drives. Prices of the Model 6 have declined, but IDC ex-

pects DP shops to pick these up to replace Model 4s. Trades are reportedly at 56% for dual-density drives.

Perhaps the last viable 3420, the Model 8, has also shown a dip in residual value. The Model 8 drives, which, because of a shortage from IBM, had been selling on the used market for above IBM list prices, have begun to decline. IDC said single-density 3420s now sell for about 85% of list value and the double-density models sell for

about 86% of list.

IBM's contention that the 3420 will not immediately vanish from most computer rooms — it said it expects the average future shop will consist of 30% 3420s and 70% 3480s — will continue to enhance the Model 8's longevity, the report added.

Because IBM can now meet user demand for 3803 Model 2 tape controllers, the price has fallen to 94% of list.

IDC, 5 Speen St., Framingham, Mass. 01701.

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SYSTEMS & PERIPHERALS

DATA STORAGE

■ **Digi-Data Corp.** has announced a magnetic tape subsystem said to provide users with a serial communications link between an RS-232 port and an IBM-compatible tape drive.

The subsystem includes Digi-Data's Model 1000 controller, which accepts 7- or 8-bit data at asynchronous transfer rates from 110 to 19.2K bit/sec. It also includes

Digi-Data's Model 2010 nine-track, 1,600 bit/in., ½-in. magnetic tape transport. The drive is said to accept any Ansi/IBM standard ½-in. tape on reels up to 10½-in. in diameter. All 1,600 bit/in. tapes produced by the drive are said to be interchangeable with those produced on any Ansi/IBM-compatible phase-encoding transport.

Prices for the single-density tape subsystems start at \$4,850.

Digi-Data, 8580 Dorsey

Run Road, Jessup, Md. 20794.

TERMINALS

■ **Industrial Computer Technologies, Inc.** has announced that it is distributing a Chinese-English display terminal manufactured by **Asia Technology, Inc. of China.**

The Panda-2000 is said to work with Alphamicro Sys-

tems, Inc. computers running under Alphamicro's proprietary operating system.

The Panda-2000 translates Chinese into English and vice versa, the vendor said.

The Panda terminal — including the monitor and Chinese character generator — costs \$2,400 in single quantities.

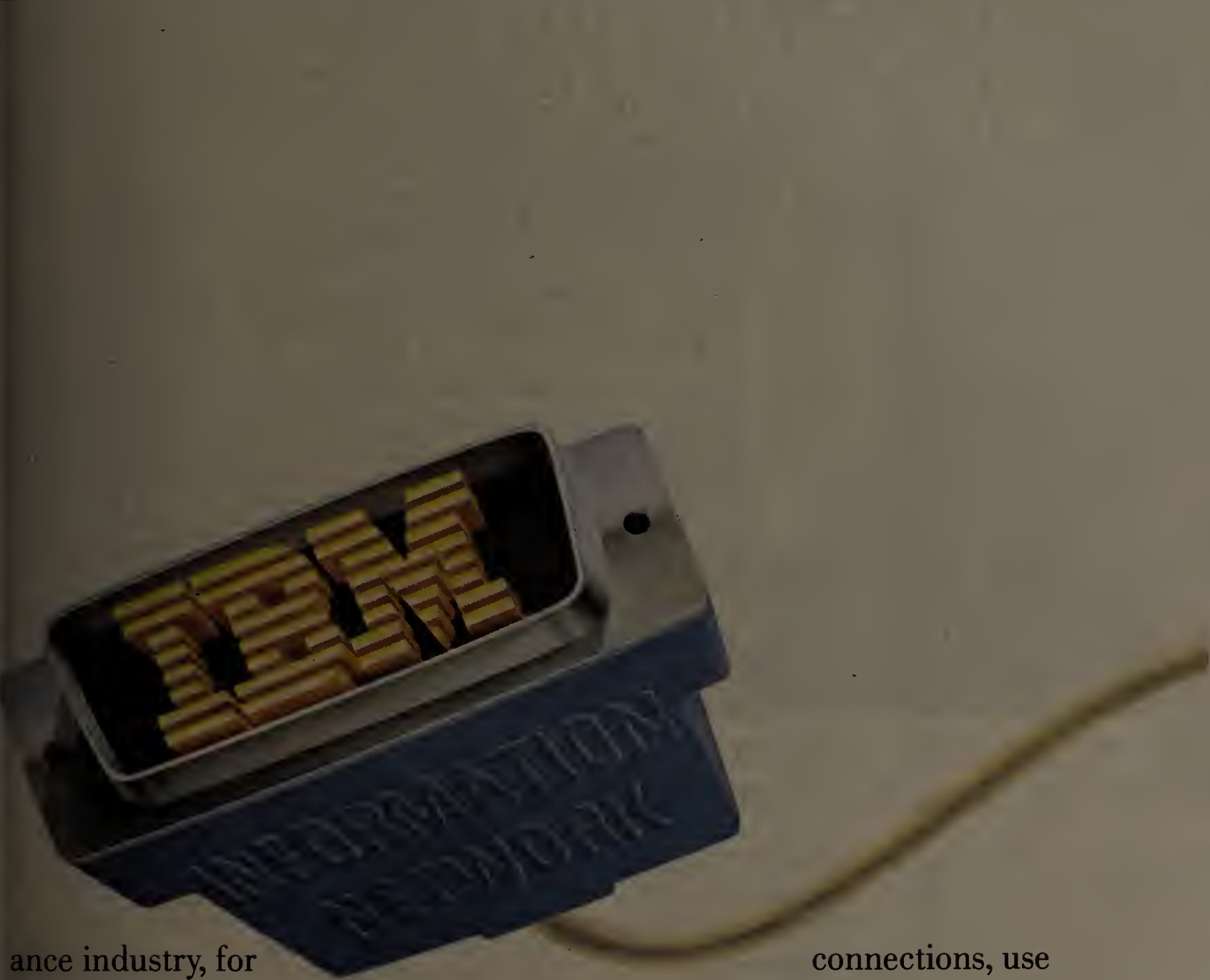
Industrial Computer Technologies, Suite E, 363 Cliffwood Park St., Brea, Calif. 92621.

PRINTERS/PLOTTERS

■ **System Industries, Inc.** has released a **Digital Equipment Corp. LP-27-compatible band printer** that can be used with DEC's PDP-11 and VAX machines.

The SI-1200 reportedly prints at 1,200 line/min. The basic unit costs \$24,000.

System Industries, 1855 Barber Lane, Milpitas, Calif. 95035.



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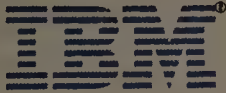
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RIDGE from page 73

with enhanced floating-point performance. It costs \$69,000.

Current users of Ridge 32C or 32S systems can upgrade their systems. A CPU optimized for floating-point processing costs \$11,500; 4M bytes of main memory consisting of a circuit board made up of 256K-bit memory chips costs \$17,500; Risc-optimized C and Pascal compilers cost \$1,500; an Ethernet connection costs \$4,000 and a 19-in. monochrome display costs \$9,900.

Ridge has also announced that it is offering three specialized configurations for specific applications that are targeted at electrical and mechanical applications.

Design and Analysis System 1 was based on the 32/110 and includes a 150M-byte hard disk drive, direct Ethernet local-area network connection and a Fortran compiler. It costs \$34,000.

Design and Analysis System 2 features a 32/130 system with 8M bytes of main memory, Ethernet connection and Fortran compiler. It costs \$45,000.

Design and Analysis System 3 uses the 32/330 system and includes a dot matrix printer, a 1,600/3.2K bit/in. tape drive for backup, a 445M-byte hard disk drive and a Fortran compiler. It costs \$75,000.

All announced systems will be available in August, the vendor said.

Ridge Computers is located at 2451 Mission College Blvd., Santa Clara, Calif. 95054.

PROJECT MANAGEMENT ON IBM S/34, 36

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COMPUTER INDUSTRY

Apple's cuts solve some of its problems

By Kathleen Burton
West Coast Bureau

CUPERTINO, Calif. — Apple Computer, Inc.'s sweeping cutbacks will make the company more competitive, but they alone will not reverse the company's sagging fortunes, according to analysts.

Apple recently announced that it will cut its work force by one-fifth, or 1,200 workers, and will close three of its six production plants.

Apple officials said costs associated with the plant closings and layoffs will result in a loss for the third quarter ending June 30, the first loss in the company's eight-year history. Analysts have estimated the loss could total \$15 million after taxes.

The company's earlier reorganization merged the Apple II and Macintosh production divisions, removed Chairman Steven P. Jobs from operational control and divided the company into two units, marketing and manufacturing.

John Sculley, Apple's president, said, "We expect these steps to significantly reduce the break-even point of the company."

Sixty percent of the layoffs occurred in Apple's manufacturing divisions, according to a spokesman. The remainder spared only Apple's research and development group and impacted employees in the sales, marketing, finance and administration divisions.

About half of the marketing layoffs were in California's Silicon Valley, where Apple employs about 2,400 people, and the rest were in other parts of Apple's worldwide operations, the company said. After the layoffs, approximately 4,600 workers will remain at the company.

Over the next three months, Apple will close plants in Carrollton, Texas; Garden Grove, Calif.; and Millstreet, Ireland. Apple

See APPLE page 87

IDC: Global success, conservative approach

THIRD OF A FIVE-PART SERIES
By Maura McEnaney
CW Staff

FRAMINGHAM, Mass. — A data base of computer installations in the U.S. and the "Gray Sheet" newsletter were the first two products launched with the 1964 founding of International Data Corp. (IDC), the granddaddy of computer market research firms.

IDC has grown from a two-person staff working from a house in a Boston suburb to a \$25 million company in 1984 with 300 employees in 13 international and seven domestic offices. Its holdings include Yates Ventures, Inc., a market research firm specializing in AT&T Unix based in San Francisco, and Link Resources, a market research firm based in New York.

IDC was founded by Patrick McGovern and is now one of the two main components of International Data Group, Inc. (IDG); the other component of IDG is a group of 57 computer-related publications,



including *Computerworld*. McGovern launched IDC out of his basement after getting a hunch that computer companies such as Xerox Corp., Burroughs and what is now Sperry Corp. could use information about computer installations. With the help of local high school students, he began data collection for IDC's first data base.

IDC views itself as a conservative company. "We don't sit down and pontificate about what's going to happen or give blue sky opinions based on our gut feeling. We combine that with reality," said William Ford, vice-president and general manager of the firm.

Perhaps it is IDC's dominant position — claiming approximately 25% of the total of a U.S. market estimated at about \$150 million — that prevents it from sticking its neck out as far as its competitors have, observers believe. The company emphasizes its 20-year-old reputation more than the press attention it receives. "We're the old-

See IDC page 83

■ The semiconductor slump showed no signs of abating, with chip maker Advanced Micro Devices announcing a four-day work-week and executive pay cuts and equipment vendor Siltec cutting 13% of its work force/78

■ Even Computeland chimed in with layoffs recently, and Storage Technology laid off another 500 workers but also resumed five-day workweeks. Meanwhile, Culinet Software had its head above the clouds with 50% growth in the fiscal year just ended/79

Analyst sees rebound ahead

By Clinton Wilder
CW Staff

BOSTON — Despite its current moribund state, the U.S. computer industry will rebound strongly by the end of this year, according to Infocorp Executive Vice-President Grant S. Bushee.

Bushee, speaking at Infocorp's mid-year forum here earlier this month, based his optimism on significant products from major vendors scheduled to be shipped in volume later this year. He also cited the growth potential for networking products as the office automation market demands more and more communication among mi-

cro and large systems.

As products such as IBM's 3084 and 3090 Model 200 mainframes, Digital Equipment Corp.'s VAX 8600, Prime Computer, Inc.'s 9955 superminis and DEC's Microvax II supermicros begin to ship in volume toward the end of the year, the industry will pick up, Bushee said. "I think the current downturn will be very short-lived," he said. "With these new systems having been announced or shipped, I foresee a rebound by the fourth quarter at the latest."

But Bushee, a cofounder of Cupertino, See UP page 86

Start-up finance wide open

OUTSIDE LINES
Robert H. Stavers

Despite the tarnished image of initial public offerings, the entrepreneurial spirit remains alive and well with a healthy appetite for investment capital. Gone are the days of sublime infatuation between the stock market and high technology. Start-ups going public overnight are now the stuff of legends rather than common occurrences. Nevertheless, entrepreneurs today can choose from a host of creative approaches.

Within the venture capital com-

munity, there remains a staggering sum of capital available, though consolidated in fewer investments. Today, venture capitalists, overextended in time, are spurning marginal business plans in favor of fewer but higher quality opportunities. And they are increasingly interested in investing in second, third or even fourth rounds of financing due to the soft initial public offering market and the resulting shortage of mezzanine or bridge financing.

Much of the action taking place today is centered on corporate partnering, or investments that large corporations make in an existing company. Many large companies believe that the innovation and development they require can be accomplished best outside their own bureaucracy. As a result, enormous

See INVEST page 85

Office information networks require management OK

By Clinton Wilder
CW Staff

BOSTON — The office automation market will not take off until corporate management sees office information networks as truly enhancing productivity, according to Bennett C. Wiseman, an Infocorp market research analyst who spoke here recently.

Wiseman said networking has so far failed to reach what he called "critical mass," or the point at which employees decide that such office information functions as electronic mail are indispensable. "Once they have it, they say they couldn't be without it, even though they don't remember why they wanted it in the first place," he said.

Addressing the third annual Infocorp mid-year forum, Wiseman said successful vendors in the growing of-

fice information network market will sell solutions rather than products. "People don't yet know what they need networks for, but they know they have information problems that need to be solved," he said. "Vague ideas about how people are going to work better or [more intelligently] won't get the purchase order signed."

Wiseman began his presentation by debunking what he called the myths of networking, such as the terms OA and "paperless office." "[OA] has confused rather than enlightened everyone because it means so many different things," he said. "The 'integrated office' is in reality a disintegrated tangle of different communications standards, and the 'paperless office' has about as much chance of becoming reality as the paperless bathroom."

See OA page 86

Stavers is a partner at Coopers & Lybrand in San Jose, Calif.

COMPUTER INDUSTRY

The chips are down: AMD, Siltec deal with cutting costs

Evidence of the continuing slump in the semiconductor industry surfaced again recently as a major chip maker, Advanced Micro Devices, Inc. (AMD), and a leading wafer and chip manufacturing equipment vendor, Siltec Corp., announced that they were taking significant cost-cutting measures.

AMD, one of the top five U.S. integrated circuit vendors, announced it will institute four-day workweeks in the quarter beginning July 8. AMD also cut its top 100 executives' salaries by 15% and froze raises for all of its employees.

The Sunnyvale, Calif.-based company said it instituted the measures to maintain its no-layoff policy and that the company policy will continue.

Short workweek affects 90%

The shortened workweek will affect about 90% of AMD's 8,000 U.S. employees. Members of AMD's field sales force, field applications engineers and selected sales support and production personnel will continue to work full-time.

AMD President and Chief Executive Officer W. J. Sanders III said the moves were designed to cut excess production capacity and bring production in line with the falling demand for chips.

Sanders said the company had been hurt by severe price cutting by Japanese competitors, which AMD has also cited in calling for trade barriers on Japanese imports [CW, June 17].

"Predatory pricing on [erasable programmable read-only memory chips], which are 20% of our business, has taken us from profitability in that product line to an expected level of losses such that . . . an overall operating loss for the current quarter seems unavoidable," Sanders said. The company said tax credits from capital investment in research and development, however, should allow AMD to post a modest net profit for the

quarter ending June 30.

Sanders said "no upturn is currently in sight" in the hard-hit semiconductor business and that AMD's sales are not expected to improve in the next quarter.

Concurrently with the shortened workweek, AMD announced that some key engineering and production employees were asked to work a

5½-day week for their current salaries in order to spur development and introduction of products.

Siltec lays off 13%

Siltec announced it will lay off 13% of its work force, consolidate its Menlo Park, Calif., wafer fabrication facility into its plant in Salem, Ore., and restructure the

management of its Silicon Business Unit.

Siltec said it will lose between \$8 million and \$11 million in the current quarter. The figures include approximately \$7 million to cover the costs of the Oregon consolidation and the establishment of a \$2 million reserve fund to reflect current inventory values as a result of

slackened demand and falling prices.

The company, based in Menlo Park, said reducing its 750-member work force by 100 would "substantially reduce the company's break-even point" but that it does not expect to be profitable "until the health of the U.S. semiconductor industry improves."

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FUSION

COMPUTER INDUSTRY

Cullinet's yearly profits up 50%

WESTWOOD, Mass. — Cullinet Software, Inc. announced that fiscal-year profits were up 50% over the previous year, even though fourth-quarter profit growth dipped below the 50% mark for the first time in several quarters. The company said revenue for the year was \$184.1 million, up 53% from \$120 million a year earlier. Profits were \$24.7 million, or 81 cents per share, up 50% from \$16.9 million, or 54 cents per share.

In the fourth quarter, Cullinet said, revenue increased 50% to \$52.7 million, from

\$35.1 million a year earlier. Profits of \$6.8 million, or 22 cents per share, did not quite meet the 50% growth benchmark of the past several quarters, but was still up 42% from year-earlier profits of \$4.8 million, or 16 cents per share.

Robert N. Goldman, president and chief operating officer, said, "Based on the excellent fourth-quarter and fiscal-1985 results, we are confident that in fiscal 1986 Cullinet will continue to exceed industry growth rates."

STC restores five-day week, lays off 500

LOUISVILLE, Colo. — Five hundred more employees of struggling Storage Technology Corp. (STC) received layoff notices last week, bringing the total number of layoffs at the debt-plagued disk drive manufacturer during the past 18

months to 6,500 and reducing STC's worldwide work force to 9,300.

Remaining STC employees received good news, however, as the company announced it would return to a five-day workweek. The layoffs will come primarily from the manufacturing and manufacturing support areas.

STC is currently under protection from its creditors under Chapter 11 of the Federal Bankruptcy Act. The company filed for protection Oct. 31, 1984.

STC Chairman Ryal R. Poppa said the company plans to submit its scheduled reorganization plan to its creditors this week. He said the work force reduction was caused by the industrywide downturn in computer peripherals and computers, rather than by a specific recent downturn at STC.

"While our disk order rate is up, our tape order rate is below expectations," Poppa said. "Therefore, we are reducing current manufacturing capacity to match this order rate."

Retail chain to cut staff

OAKLAND, Calif. — Computerland Corp. recently announced the first layoffs in its nine-year history, trimming its domestic corporate staff by 10%, or 128 employees.

The personal computer retail chain also said it will reduce nonpersonnel-related expenses. Computerland maintains 810 franchised retail stores and employs about 1,130 people worldwide, 80% of them in the San Francisco-Oakland, Calif., area.

"Based on the current flattening of the personal computer market, this is the responsible course to take in order to ensure that Computerland can continue to provide key services to our franchisees," said Computerland President and Chief Operating Officer Barbara J. Milard.

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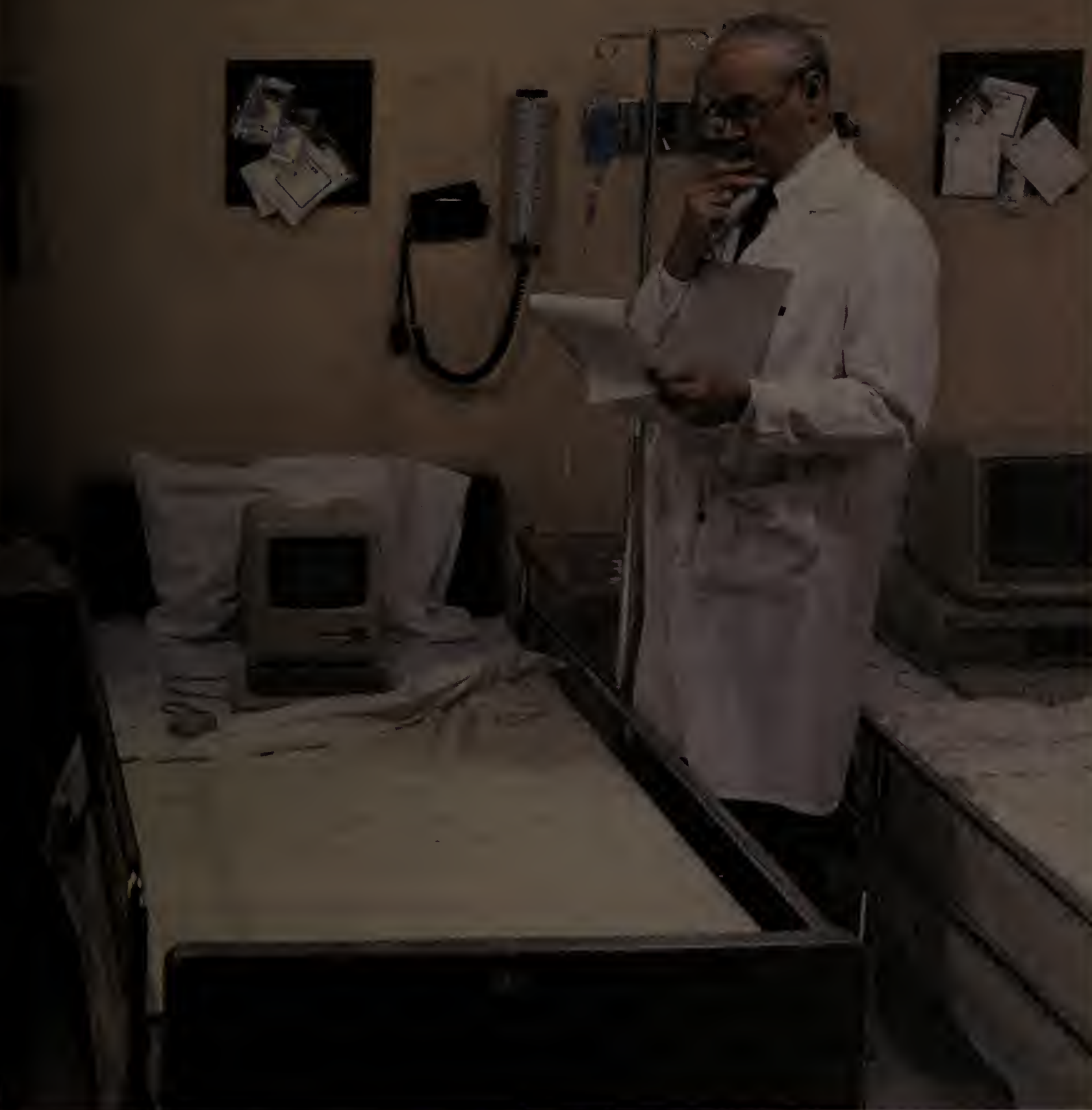
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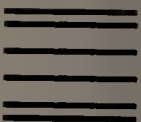
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COMPUTER INDUSTRY

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est in the business and have proven to be the most reliable," said IDC President Peter Rowell. "We have not taken part in very hype-filled predictions," he added.

Rowell joined IDC's UK operations nine years ago and shortly after was made managing director, building up the European operations to include six subsidiary offices and eight agency offices. Two years ago, Rowell was brought to the U.S. to take the reins at IDC's corporate offices.

The company's business is to provide a hand-holding service to our clients," which consist of vendors, computer users and financial firms, Rowell said. "We are a service organization where the responsiveness to clients, answering their day-to-day questions and providing basic information is of paramount importance."

IDC covers all sectors of information processing, including data processing, communications, office automation and software. The products fall into one of four categories: data bases, which are sold to more than 1,000 clients annually; continuous information services, said to be the most profitable of IDC's products;

custom consulting; and newsletters.

Approximately 60% of IDC's 3,000 international clients are computer vendors seeking information on market share and product direction, according to Rowell. About 30% of the firm's clients are computer users from Fortune 500 companies. The remaining 10% of the clients are firms in the financial service industry.


The company published more than 250 reports last year, along with seven special reports on topics ranging from a computer industry review and forecast to IBM strategy and personal computer networks. This year, IDC will add 10 more studies covering topics that include text retrieval systems, factory communications and Apple Computer, Inc.'s Macintosh Office system.

Ford said that while competitors view IDC as a number-crunching service, the firm provides much more than that. IDC does rely heavily on "primary data," Ford said, but that data is later combined with analysis in its final reports.

Although some of its analysts such as William Zachmann, vice-president of corporate research, and Jack Hart, vice-president of International Services, enjoy notoriety in both the trade and general press — Zachmann




AT A GLANCE



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Peter Rowell
IDC president

was one of the few industry observers who predicted the current industry downturn — IDC sees itself as somewhat subdued, compared with its competitors.

"We are a conglomerate of individual personalities," said Rowell, who is less visible than his counterparts in other market research firms. "Some of our competitors are built around the personalities of certain individuals," he noted.

IDC's dominance in the market place has been eroded somewhat by younger companies such as Dataquest, Inc., the Yankee Group, the

Gartner Group, Inc. and Future Computing, Inc.

"Back when there weren't too many market research companies, IDC was king," said former IDC vice-president Harry Henry, who left IDC a year ago to form his own consulting firm. But, he noted, as the computer industry grew into areas outside IDC's domain, IDC was left open to competition. Each of IDC's competitors today got its start by emphasizing an area not fully serviced by IDC, Henry said.

When IDC was slow to pick up on the emerging growth of the microcomputer industry — a blunder that Rowell clearly recognizes — Future Computing was born.

Recovery from micro error

"We missed the boat in micros to begin with," he said. Today, IDC is attempting to recover from its judgmental error by concentrating on micros in a few specific areas, including the value-added reseller end. "Our microcomputer services is one of the fastest growing services," he said.

For Rowell, maintaining IDC's approximate 30% annual growth rate means a "more-of-the-same" approach. "We must do more of what we've been doing," to compete against firms like Dataquest, Gartner Group and Future Computing, he said. "I want to build our expertise in all areas, to cover absolutely everything. But we're being forced, marketwise, to concentrate on certain issues."

IDC remains committed to building up its client base, with some specific directions in mind. "We want to be more flexible in our user services," Rowell said. Right now, he noted, "We have a number of very rigid services aimed at senior management within large corporations."

The First National Bank of Chicago has been an IDC client since it first formed its MIS department seven years ago. "When we started looking for a consulting service, [IDC] was the only one that offered us what we needed," said systems officer Jack Phillips. The bank primarily uses IDC's Information Systems Planning Service, which provides four reports, the "Gray Sheet," bulletins, conference admission and phone inquiry.

According to Phillips, IDC's telephone inquiry services "give us a place to go for answers to questions about other users. For the bank's purposes, some of IDC's services are "getting far afield" from its needs, he said. "We're really not interested in a lot of the industry-related marketing stuff like the future of the computer market in Japan."

IDC may shift its focus to attract

See IDC page 87



Service	Description	User/Vendor Oriented	Price*
Continuous Information Services			
Information Systems Planning Service	Gives users access to research reports, unlimited telephone inquiries, newsletters, seminars and conferences	User	\$20,000
Strategies for Microcomputers and Office Systems	Consulting service for large information-processing users; covers hardware, software acquisitions and development	User	\$15,000
Communications Technology Service	Provides information on emerging technologies, major vendors and product integration	User	\$15,000
Vendor Services			
Computer Market Planning Service	Covers data, voice and video telecommunications areas; includes consultation on management and regulatory issues for planning, implementing control and generating communications services	User	\$15,000
Corporate Planning Service	Examines major computer systems and peripheral markets; presents surveys on major computer systems users	Vendor	\$30,000
Focus Programs	Analysis of vendor strategies, trends and market data	Vendor	\$30,000
Communications Industry Research	Market data and analyses in five areas: large systems; small and medium systems; storage products; printer market; workstations	Vendor	\$12,000 each
Office Automation Market Planning Service	Focuses on markets, technologies and user field research	Vendor	\$18,000
Software and Services Information Program	Market forecasts of imaging systems, word processing equipment, desktop computers and electronic mail	Vendor	\$15,000
Customer Service Program	Covers applications tools and software for large- and medium-size systems; focuses on opportunities for value-added suppliers in applications tools	Vendor	\$20,000
Microfocus '85	Designed for field service executives doing strategic planning; program modules are product-specific	Vendor	\$22,000
Vertical Market Services			
Procurement Information Management Service	Emphasizes value-added reseller and vertical market niches	Vendor	\$15,000
Financial Data Service	Analysis of DP/telecommunications acquisition for federal agencies	User	\$15,000
Computer-Integrated Manufacturing Service	Focuses on federal government acquisition policies for equipment suppliers	Vendor	\$15,000
Financial Services	Covers issues in manufacturing automation	User	\$15,000
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COMPUTER INDUSTRY

INVEST from page 77

amounts of money are being plowed into this strategy to acquire new products, services and technologies quickly and cheaply.

There are three primary advantages to this financing method. First, the corporate partner can supply large sums of capital, often at a cheaper cost than venture capitalists.

Second, it can arrange for marketing the new company's goods, often a tremendously capital-intensive function. If the new company is a manufacturer, the corporate partner can provide manufacturing capabilities under contract.

Finally, a corporate partner can provide a second source of the product. Of course, a downside for the entrepreneur may be giving up future flexibility; the corporate partner's goals may differ from those of the new company.

Partnerships as financing vehicles

Equity partnerships continue to be used as financing vehicles among start-up high-technology companies. An equity partnership is frequently a traditional venture capital investment, with the company starting out as a partnership that allows tax deductions to flow through to some or all of the backers.

Following the development period, the partnership will be "rolled up" into a corporation. Depending on the tax needs of the investors, these partnerships can be very attractive, as the available deductions serve to reduce the investment risk. The entrepreneur benefits through these tax deductions by gaining leverage in negotiations with the investors.

To remain viable and competitive, companies need a commitment from every employee to achieve success. One response to this need has been the increased use of employee stock option plans. These plans provide a new source of financing to high-tech firms, since the new tax laws allow banks to treat a portion of the interest received from employee stock option plan loans as nontaxable.

Loans from stock option plans

As a result, companies may be able to secure loans from banks by use of leveraged employee stock option plans in situations where the loan would otherwise be too costly. Variations of a stock option plan loan often play a part in leveraged buy-outs and corporate divestitures. Although not a new financing scheme, the practice is growing steadily in popularity.

Young companies seeking financing for fixed assets often find that banks require substantial compensating balances to be maintained until several quarters of profitability have been achieved. This puts a big restriction on available cash — often hard fought for in an earlier venture capital financing.

Venture leasing allows a firm to offer warrants to purchase stock in the company at a fixed price to the leasing company or bank and can eliminate the compensating cash balance. Warrants can also be offered to OEMs that commit to large purchase orders. In these cases, the OEM customer earns more warrants at higher and higher levels of purchases and, therefore, has an incentive to continue buying.

Warrants may be issued up front

at a fixed price and earned as the company actually buys predetermined levels of products or structured so that the price is not fixed until the warrants are earned. In either case, the accounting implications of these arrangements must be carefully analyzed in advance.

Although not strictly a financing method, warrants can encourage customers to enter into early and significant contracts with the expectation of acquiring stock and profiting through the success of the company.

Least common among the variety of funding alternatives available to a start-up is debt financing. While companies who are shipping products and have investments and accounts receivable can obtain credit lines, it is very difficult for a young company to collateralize fully a loan without assets.

When used by small- to medium-size companies, debt financing increasingly involves a combination of debt and equity. By adding warrants, lenders gain the benefit of upside potential if the company is successful, and warrants allow companies to obtain debt that would otherwise be too expensive or unavailable.

Research and development partnerships have fallen into some disfavor as a result of high risk and diminished tax advantages for many private investors. Until recently, many companies raised money through R&D partnerships, whereby an existing company contributed technology to a partnership, which raised capital from limited partners. Investors took 80% to 90% tax write-offs in the first year, with promises of 30% to 40% after-tax returns. Investment bankers oversold these ve-

hicles; investors blindly went into them without appreciating the risks involved; and the high-tech companies often failed to communicate with their investors. Thus, the investment and business communities are more wary of R&D deals now.

However, money from an R&D partnership is cheaper than equity money because investors look for substantial tax savings. The partnership concept remains a useful, if somewhat abused, tool. Companies should enter such agreements with caution. For instance, if a research and development deal is royalty based, the company must bear a percentage of sales or part of its costs. If the technology is acquired with stock, the current fair value of the stock must be amortized over future periods, which puts additional strain

See **INVEST** page 87

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COMPUTER INDUSTRY

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Wiseman, director of Cupertino, Calif.-based Infocorp's fledgling office information network market research service, said the technology and price/performance ratios of office computers have grown by leaps and bounds, while their ability to communicate with each other has lagged far behind. "In 1966, an IBM Selectric typewriter cost \$12,000, or the price of two Cadillacs," Wiseman said.

"In 1985, you can buy 12 word processors for the price of one Cadil-

lac. But the problem is similar to the early days of the auto industry — not enough good roads. Office computers need the equivalent of the interstate highway system — the inter-office information system."

In the near future, hierarchical networks such as micro-to-mainframe links will see greater success than peer-to-peer network connections, Wiseman predicted. "Large organizations like the hierarchy of their mainframe and its software systems at the top," he said. "With workstation-based local-area networks, the anarchy [that is] implied

goes against their grain. In general, organizations are slow adapters."

For similar reasons, Wiseman's network market forecast is based on the assumption that users want to link their current installed base rather than purchase computer hardware to run on a network. According to Wiseman, "The installed base will drive the workstation market, and the workstation market will drive the demand for printers and file servers."

Opportunities exist to gain market share

Wiseman concluded that wide op-

portunities to gain market share exist in the office information network business, largely because the market contains many diverse niches and has no clear market leader.

He predicted the largest future office information network market will consist of current noncomputer users in an office who will eventually choose electronic replacements for "their telephones, in-baskets and notepads."

"These are people who don't like computers and never will," Wiseman said. "But if vendors offer them solutions to a problem, they will buy."

UP from page 77

Calif.-based Infocorp, qualified his optimism with a warning about the health of the U.S. economy. He does not expect overall capital investment and the Index of Leading Economic Indicators to fall significantly over the course of the year but said that the computer industry will suffer if they do.

"I'm assuming the economy will remain strong," he said. "If it turns sour, we could be in for a lot longer downturn than anyone expected."

Bushee said that the absence of local-area network standards and other interconnection shortcomings have contributed to the current downturn, but at the same time, they represent a major potential growth area for the industry.

"In the early 1980s, organizations spent heavily on computers, especially micros," Bushee noted. "Now they all require system interconnection — the key issue facing the industry today. It has been an Achilles' heel to date, but it also represents the most golden opportunity."

Bushee said the lack of networking reliability has contributed to a big problem facing vendors: user dissatisfaction. "As users become more and more familiar with computers, they find out the shortcomings — that the promise has exceeded the reality," he said.

The most successful vendors in the future will be those that market their products as solutions to specific office, industry and home problems rather than as technological wonders, Bushee predicted.

Bushee said the industry's most important growth areas in the near term will be solutions that tie users together through office information networks, file servers, multiuser systems and departmental systems such as a Microvax II or a Hewlett-Packard Co. HP 3000 Model 37.

Bushee concluded that as the industry approaches 1990, there will be significant growth in scientific/technical niche markets, portable computers and artificial intelligence systems.

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COMPUTER INDUSTRY

APPLE from page 77

Apple's automated plant in Fremont, Calif., will continue to produce IIc and Macintosh computers, while production of Apple IIe products will be shifted to Singapore, and the Cork, Ireland plant will continue European distribution.

"In recent weeks, the mood here has been serious and somber," said William V. Campbell, Apple's vice-president of U.S. sales and manufacturing. "During the layoffs, there were tears mixed with a great deal of optimism about the future. The

mixed mood is difficult to describe, but the morale of those remaining is good."

According to Campbell, 21% of Apple's work force was eliminated because the reorganization caused a duplication of marketing and manufacturing efforts within the company. Now, the company's costs will be lower, and it will be able to bring products to the market faster, Campbell said.

Although the shake-up was larger than expected, analysts have said it will leave Apple more competitive. "It will mean a stronger Apple over

the long haul," said John Dean, a computer analyst at Montgomery Securities in San Francisco.

However, several fundamental problems must still be resolved, he said. According to Dean, the company's largest obstacle will be to deliver the products it has announced. Immediate priorities, he said, are a file server and personal computer network card for the Macintosh Office.

Because of the sales slowdown in both home and business computers, sales for the current quarter will be about \$390 million, approximately 10% less than the \$435.3 million for

the previous quarter, Dean said.

Apple's plant consolidations were necessary for the company's survival, said Aaron Goldberg, an analyst at International Data Corp. in Santa Clara, Calif. Apple's manufacturing operations were running at 60% of capacity since February because it was selling less than 25,000 Macintosh computers a month.

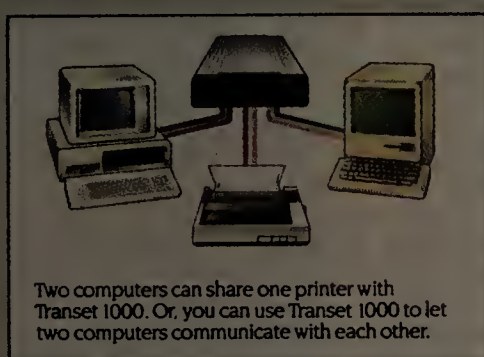
According to Goldberg, the reorganization and layoffs indicate that the company is now operating as a financially disciplined Fortune 500 firm, "not like an entrepreneurial outfit still run from a garage."

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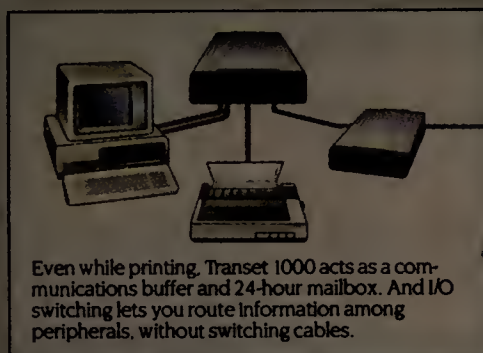
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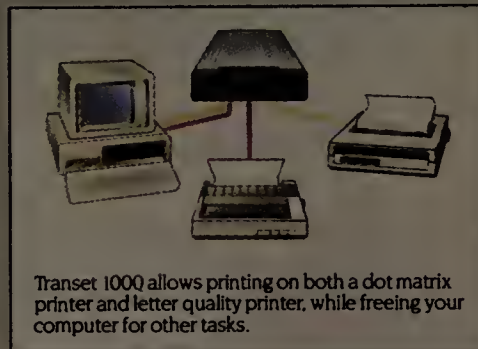
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INVEST from page 85

on the profits of an emerging firm.

Finally, the ownership of the developed technology should be made as clear as possible to make it harder to find investors.

IDC from page 83

smaller client companies, Rowell said. "There are many organizations that have no interest in and cannot afford the type of service we're providing," according to Rowell. "We can restructure some new services to focus more on smaller users," he said. Providing more strategic services to users is also a future direction for the company, he said.

For MIS managers in medium-size businesses, IDC has recently introduced "Information Systems: Issues '85," a program focusing on hardware vendor strategies, organizational trends, software engineering and communications. The program gives MIS managers eight IDC reports, telephone consultations on those report topics, newsletters, bulletins and access to the company's Fall Executive Conference. Annual cost of the program is \$7,500.

The company is also attempting to make its mark on the investment community. IDC announced a \$1 million contract with Goldman Sachs & Co. that will give the investment firm access to IDC research information.

But IDC's attempt to cover all aspects of the computer industry has its drawbacks, former Vice-President Henry believes. "When you are the biggest out there, people come to expect everything from you. It's nice to be big, but it sure is a heavy cross to bear sometimes."

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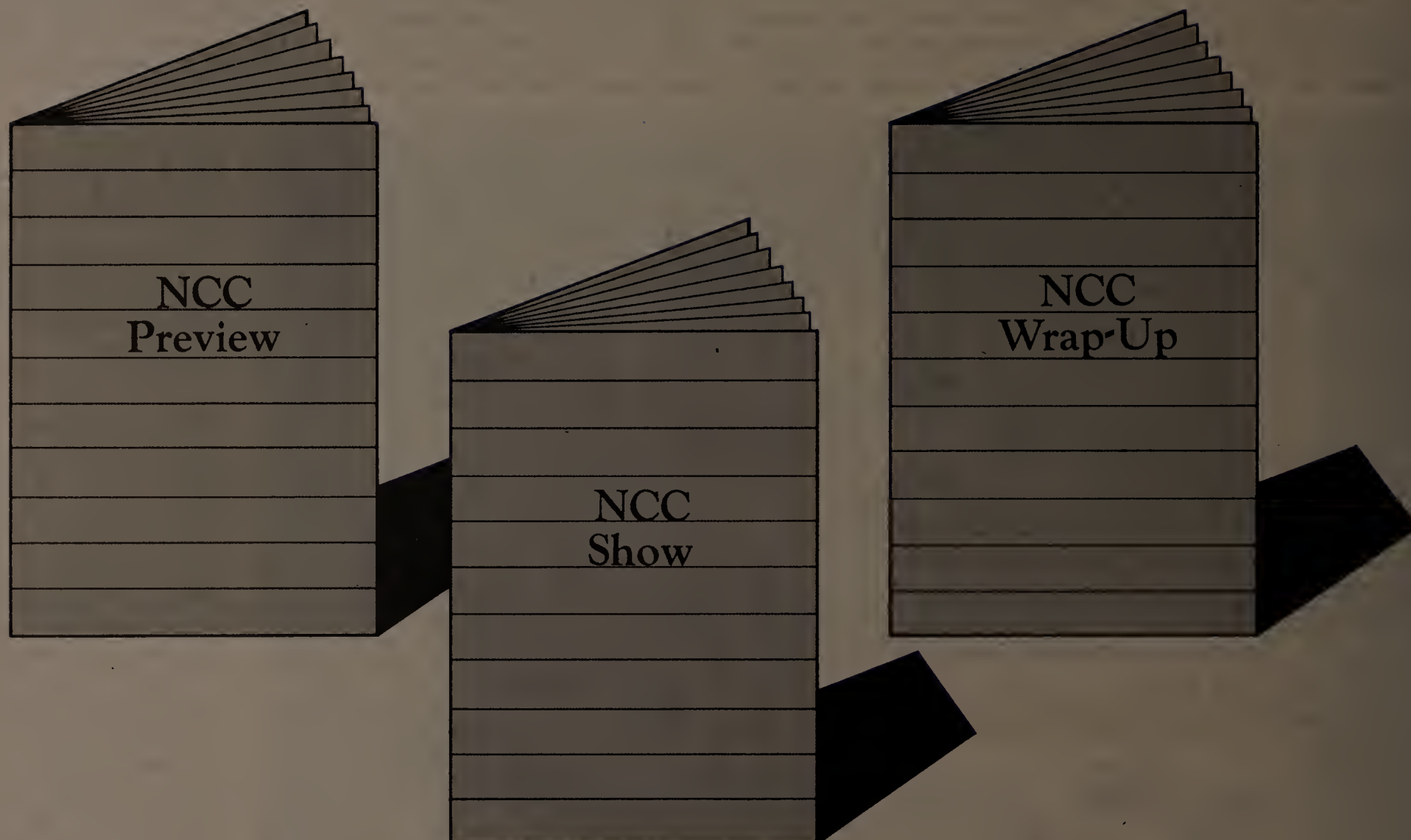
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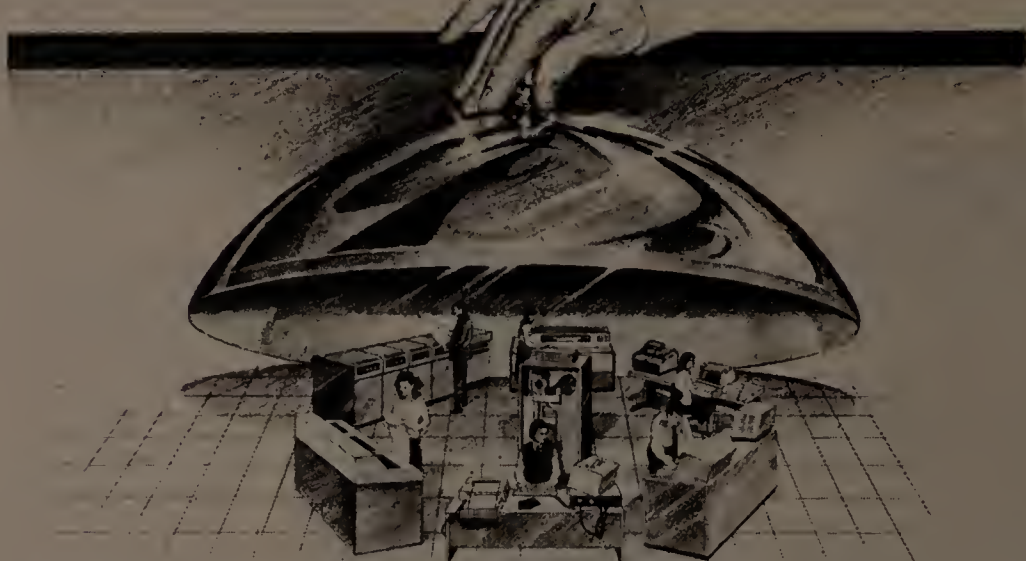
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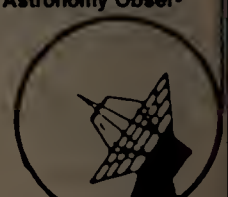
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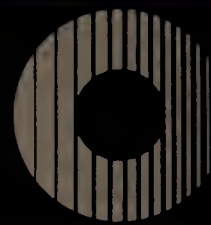
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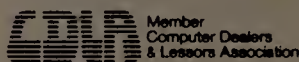
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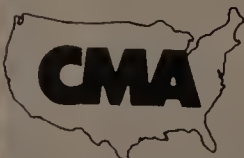
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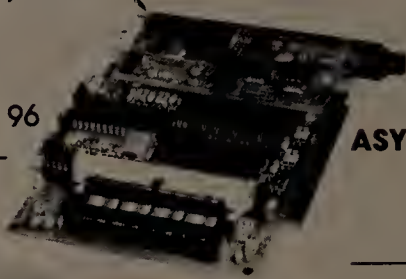
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Respondents must be able to offer an appropriate team of employees domiciled in or near Chester County and must demonstrate substantial relevant experience performing similar services.

The bid package will be available o/a July 16, 1985. A pre-bid conference and facility walk-through will be held on July 23, 1985 at 2 p.m. at the Chester County Courthouse, Fifth Floor, High and Market Streets, West Chester, PA, 19380. Proposals are due August 6, 1985, and the contract is scheduled for award by August 27, 1985.

A bidders list is now being prepared. Please address bid-package requests and questions regarding this procurement to Ted Jacobs, Purchasing Coordinator, Office of Commissioners, County of Chester, at the above address, or call him or Mark Rupsis at (215) 431-6100.

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The bid package will be available o/a July 26, 1985. A pre-bid conference will be held on August 1, 1985 at 10 a.m. at the Chester County Courthouse, Fifth Floor, High and Market Streets, West Chester, PA, 19380. Proposals are due August 20, 1985, and the contract is scheduled for award by September 17, 1985.

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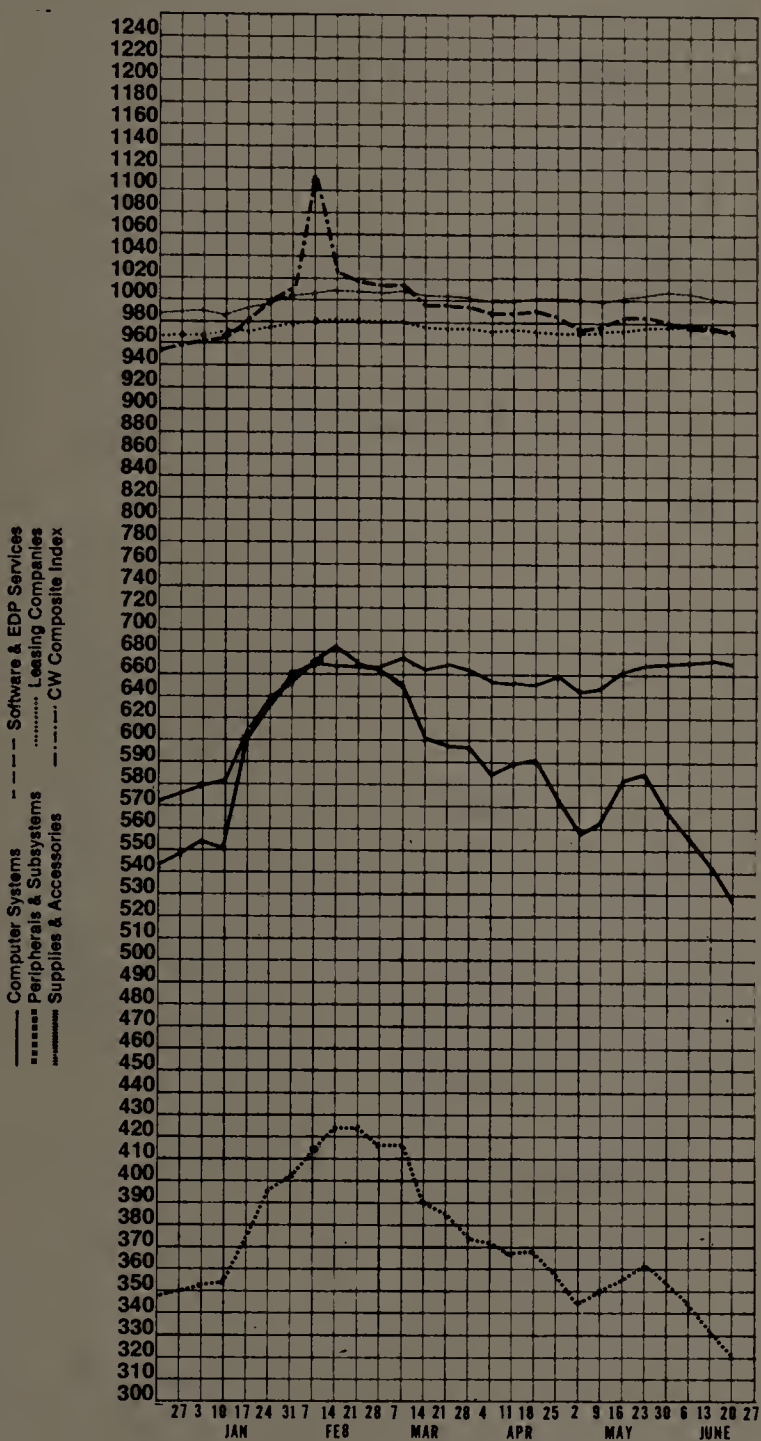
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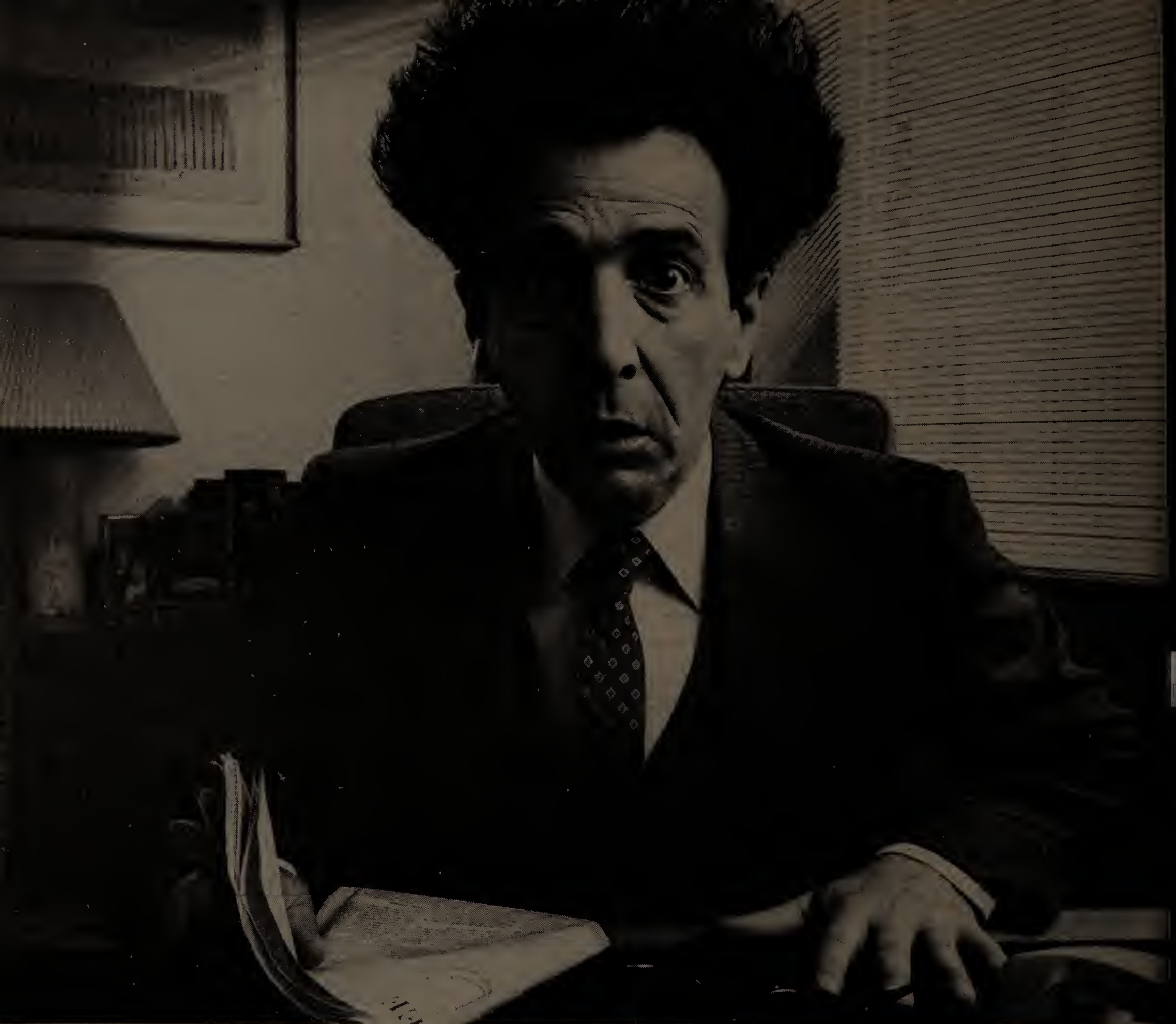
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All statistics compiled
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E X C H	1985 RANGE (1)	PRICE				WEEK NET CHNGE	WEEK PCT CHNGE
		1985 CLOS JUN 18 (1)	WEEK NET CHNGE	WEEK PCT CHNGE			
COMPUTER SYSTEMS							
D ALPHA MICROSYSTEMS	8-24	8 1/8	-1/8	-2.0			
D ALTOS COMPUTER SYST	7-21	8 7/8	0	0.0			
A ANDAL CORP	10-18	11 1/4	-5/8	-5.2			
D APPLE COMPUTER INC	18-63	13 5/8	-1/8	-0.7			
N AT&T	15-24	23 7/8	+3/8	+1.5			
N BURROUGHS CORP	48-68	56 1/4	-3 1/8	-5.2			
D COMPAQ COMPUTER CP	4-15	8 1/8	+5/8	+8.3			
D COMPUTER AUTOMATION	3-17	5	-3/4	-13.0			
A COMPUTER CONSOLES	5-20	5 1/4	-1 1/2	-22.2			
N CONTROL DATA CORP	25-38	24 5/8	-3 1/8	-11.2			
D CONVERGENT TECHNOL	5-41	5 1/8	-7/8	-14.5			
N CRAY RESEARCH INC	38-82	78 1/8	-3/8	-0.4			
D DAISY SYSTEMS CORP	14-36	22 1/2	-1/4	-1.0			
N DATA GENERAL CORP	33-74	33 1/8	-1 1/4	-3.6			
N DATAPoint CORP	12-28	11 7/8	-2	-14.4			
N DIGITAL EQUIPMENT	77-125	88 7/8	-4 5/8	-4.8			
A EECO INC	12-18	13 3/8	-7/8	-8.1			
N ELECTRONIC ASSOC.	3-7	4 3/8	-1/4	-5.4			
N FLOATING POINT SYST	13-31	25 1/2	+1/4	+0.8			
N FOXBORO	25-38	25 1/4	-1 1/2	-5.8			
SOFTWARE & EDP SERVICES							
D ADVANCED COMP TECH	2-8	3 1/4	-1/4	-7.1			
N ADVANCED SYSTEMS INC	8-22	11 1/4	+1/2	+4.5			
N AOS COMPUTERS INC	10-32	13 5/8	-5/8	-4.3			
D AMERICAN SOFTWARE	8-20	12 1/2	+1/4	+2.0			
N ANACOMP INC	1-5	2 3/4	-5/8	-18.5			
D ANALYSTS INTL CORP	5-17	10	0	0.0			
A APPLIED DATA REG	18-38	34 1/4	+1/2	+1.4			
D ASHTON TATE	6-15	8 7/8	-1/4	-2.7			
D ASK COMPUTER SYSTEMS	11-24	10 3/4	-1/2	-4.4			
D ASTRODYNE COMP INC	1-7	3	0	0.0			
N AUTOMATIC DATA PROC	30-48	48 1/2	0	0.0			
D COMPUTER ASSOC INT'L	15-35	25 1/2	+3/4	+3.0			
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D CONSHARE	6-14	8 3/4	0	0.0			
N CULLINET SOFTWARE	12-33	24 1/4	+1 1/2	+8.5			
D CYCARE SYSTEMS INC	16-27	21 3/4	-3/4	-3.3			
D HOGAN SYSTEM INC	4-27	3 7/8	-3/4	-18.2			
N GENERAL ELECTRIC CO	48-85	58 7/8	-3/4	-1.2			
D GENL MOTORS E (EDS)	18-40	38 3/8	-1 1/2	-3.7			
N GTE CORP	38-45	42 5/8	-1/8	-0.2			
N INFORMATICS GENERAL	14-27	25 3/4	0	0.0			
D INFORMATION SCIENCE	2-17	1 3/4	-1/4	-12.5			
D INFOTRON SYSTEMS CP	15-43	18 1/8	-1 3/8	-7.0			
D KEANE ASSOCIATES	8-18	17 1/4	-1/4	-1.4			
A LOGICON	18-34	31 3/8	-1 1/8	-3.4			
D LOTUS DEVELOPMENT CP	15-40	24 1/2	-1 1/4	-4.8			
D MCI COMMUNICATIONS	6-28	7 3/4	0	0.0			
D MIND SCI AMER INC	8-33	14 1/2	+1/8	+0.8			
D MATHEMATICAL APP ORP	3-18	3	-1 1/2	-33.3			
D MATHSON SYSTEMS INC	16-30	16 1/4	0	0.0			
D MICROPRO INT'L CP	2-10	2 1/8	-1/8	-5.5			
D NATIONAL DATA CORP	8-28	11 3/8	-3/8	-3.1			
D ON-LINE SOFTWARE INT	4-28	6 3/4	-3/8	-5.2			
D PANBOPHIC SYSTEMS	11-30	21 1/4	-1 1/2	-8.5			
N PLANNING RESEARCH	10-15	13	0	0.0			
D POLICY MGMT SYST CP	22-35	21 1/2	-2	-8.5			
D PROGRAMMING & SYS	4-8	5 1/2	-1/8	-2.2			
D REYNOLDS & REYNOLD	28-35	38	0	0.0			
D SEI CORP	11-34	16 3/4	0	0.0			
D SHARED MEDICAL SYST	23-43	28 1/4	-3/8	-1.2			
D SCIENTIFIC COMPUTERS	5-14	5 7/8	-1/8	-2.0			
D SOFTWARE AD	8-21	12 5/8	+1/8	+1.0			
N URS CORP	10-14	11	-1	-8.3			
N UCCEL	7-17	12 1/4	-3/4	-5.7			
PERIPHERALS & SUBSYSTEMS							
P AM INTERNATIONAL	2-7	4 1/8	+1/8	+3.1			
A ANDERSON JACOBSON	3-11	3	-1/4	-7.8			
D ART RESEARCH INC	7-20	13 7/8	-3/8	-2.5			
D AUTO-TROL TECHNOLOGY	7-28	6 3/4	-1 1/4	-15.6			
D AVANT-GARDE COMPUTO	7-28	6 3/4	-1 1/4	-15.6			
D BANCORP INC	5-22	7 7/8	-1/4	-3.0			
A BEEHIVE INT'L	1-7	1/2	0	0.0			
N BOLT-BERANEX & NEN	17-30	24	-7/8	-3.5			
D CAMDEX CORP	1-3	1 5/8	-1/8	-6.8			
N CENTRONICS DATA COMP	3-14	2 7/8	-1/8	-4.1			
A CETEC CORP	8-12	8 3/8	+1/2	+8.5			
A COGNITRONICS	4-8	4 3/4	+1/4	+5.0			
SUPPLIES & ACCESSORIES							
N AMERICAN BUS PRODS	17-27	24 3/4	+7/8	+3.8			
N BARRY NRIGHT	18-33	17 3/4	-1/2	-2.7			
A DUPLEX PRODUCTS INC	22-38	35	-1 1/8	-3.1			
N ENNIS BUS. FORMS	18-38	38 1/8	+1 3/8	+3.7			
N JN COMPANY	88-88	75 3/8	-1 3/8	-1.7			
N MOORE CORP LTO	18-53	18 1/4	+1/2	+2.8			
D STANDARD REGISTER	14-33	32 1/4	-1	-3.0			
N WALLACE CORP SERVICE	23-38	35 1/4	-1 1/8	-3.0			
COMPUTER SYSTEMS							
D ALPHA MICROSYSTEMS	8-24	8 1/8	-1/8	-2.0			
D ALTOS COMPUTER SYST	7-21	8 7/8	0	0.0			
A ANDAL CORP	10-18	11 1/4	-5/8	-5.2			
D APPLE COMPUTER INC	18-63	13 5/8	-1/8	-0.7			
N AT&T	15-24	23 7/8	+3/8	+1.5			
N BURROUGHS CORP	48-68	56 1/4	-3 1/8	-5.2			
D COMPAQ COMPUTER CP	4-15	8 1/8	+5/8	+8.3			
D COMPUTER AUTOMATION	3-17	5	-3/4	-13.0			
A COMPUTER CONSOLES	5-20	5 1/4	-1 1/2	-22.2			
N CONTROL DATA CORP	25-38	24 5/8	-3 1/8	-11.2			
D CONVERGENT TECHNOL	5-41	5 1/8	-7/8	-14.5			
N CRAY RESEARCH INC	38-82	78 1/8	-3/8	-0.4			
D DAISY SYSTEMS CORP	14-36	22 1/2	-1/4	-1.0			
N DATA GENERAL CORP	33-74	33 1/8	-1 1/4	-3.6			
N DATAPoint CORP	12-28	11 7/8	-2	-14.4			
N DIGITAL EQUIPMENT	77-125	88 7/8	-4 5/8	-4.8			
A EECO INC	12-18	13 3/8	-7/8	-8.1			
N ELECTRONIC ASSOC.	3-7	4 3/8	-1/4	-5.4			
N FLOATING POINT SYST	13-31	25 1/2	+1/4	+0.8			
N FOXBORO	25-38	25 1/4	-1 1/2	-5.8			
SOFTWARE & EDP SERVICES							
D ADVANCED COMP TECH	2-8	3 1/4	-1/4	-7.1			
N ADVANCED SYSTEMS INC	8-22	11 1/4	+1/2	+4.5			
N AOS COMPUTERS INC	10-32	13 5/8	-5/8	-4.3			
D AMERICAN SOFTWARE	8-20	12 1/2	+1/4	+2.0			
N ANACOMP INC	1-5	2 3/4	-5/8	-18.5			
D ANALYSTS INTL CORP	5-17	10	0	0.0			
A APPLIED DATA REG	18-38	34 1/4	+1/2	+1.4			
D ASHTON TATE	6-15	8 7/8	-1/4	-2.7			
D ASK COMPUTER SYSTEMS	11-24	10 3/4	-1/2	-4.4			
D ASTRODYNE COMP INC	1-7	3	0	0.0			
N AUTOMATIC DATA PROC	30-48	48 1/2	0	0.0			
D COMPUTER ASSOC INT'L	15-35	25 1/2	+3/4	+3.0			
D COMPUTER HORIZONS	8-20	8 5/8	-1/2	-5.4			
D COMPUTER NETWORK	5-11	8 1/4	+1	+13.7			
N COMPUTER SCIENCES	11-17	18 5/8	+3/8	+2.3			
D COMPUTER TASK GROUP	8-16	14 1/4	+3/4	+5.5			
D COMPUTER USAGE	1-18	1/4	0	0.0			
D COMPUTONE SYSTEMS	4-23	6 1/2	+1/8	+1.8			
D CONSERV CORP	1-16	3 3/8	-3/8	-10.0			
D CONSHARE	6-14	8 3/4	0	0.0			
N CULLINET SOFTWARE	12-33	24 1/4	+1 1/2	+8.5			
D CYCARE SYSTEMS INC	16-27	21 3/4	-3/4	-3.3			
D HOGAN SYSTEM INC	4-27	3 7/8	-3/4	-18.2			
N GENERAL ELECTRIC CO	48-85	58 7/8	-3/4	-1.2			
D GENL MOTORS E (EDS)	18-40	38 3/8	-1 1/2	-3.7			
N GTE CORP	38-45	42 5/8	-1/8	-0.2			
N INFORMATICS GENERAL	14-27	25 3/4	0	0.0			
D INFORMATION SCIENCE	2-17	1 3/4	-1/4	-12.5			
D INFOTRON SYSTEMS CP	15-43	18 1/8	-1 3/8	-7.0			
D KEANE ASSOCIATES	8-18	17 1/4	-1/4	-1.4			
A LOGICON	18-34	31 3/8	-1 1/8	-3.4			
D LOTUS DEVELOPMENT CP	15-40	24 1/2	-1 1/4	-4.8			
D MCI COMMUNICATIONS	6-28	7 3/4	0	0.0			
D MIND SCI AMER INC	8-33	14 1/2	+1/8	+0.8			
D MATHEMATICAL APP ORP	3-18	3	-1 1/2	-33.3			
D MATHSON SYSTEMS INC	16-30	16 1/4	0	0.0			
D MICROPRO INT'L CP	2-10	2 1/8	-1/8	-5.5			
D NATIONAL DATA CORP	8-28	11 3/8	-3/8	-3.1			
D ON-LINE SOFTWARE INT	4-28	6 3/4	-3/8	-5.2			
D PANBOPHIC SYSTEMS	11-30	21 1/4	-1 1/2	-8.5			
N PLANNING RESEARCH	10-15	13	0	0.0			
D POLICY MGMT SYST CP	22-35	21 1/2	-2	-8.5			
D PROGRAMMING & SYS	4-8	5 1/2	-1/8	-2.2			
D REYNOLDS & REYNOLD	28-35	38	0	0.0			
D SEI CORP	11-34	16 3/4	0	0.0			
D SHARED MEDICAL SYST	23-43	28 1/4	-3/8	-1.2			
D SCIENTIFIC COMPUTERS	5-14	5 7/8	-1/8	-2.0			
D SOFTWARE AD	8-21	12 5/8	+1/8	+1.0			
N URS CORP	10-14	11	-1	-8.3			
N UCCEL	7-17	12 1/4	-3/4	-5.7			
SUPPLIES & ACCESSORIES							
N AMERICAN BUS PRODS	17-27	24 3/4	+7/8	+3.8			
N BARRY NRIGHT	18-33	17 3/4	-1/2	-2.7			
A DUPLEX PRODUCTS INC	22-38	35	-1 1/8	-3.1			
N ENNIS BUS. FORMS	18-38	38 1/8	+1 3/8	+3.7			
N JN COMPANY	88-88	75 3/8	-1 3/8	-1.7			
N MOORE CORP LTO	18-53	18 1/4	+1/2	+2.8			
D STANDARD REGISTER	14-33	32 1/4	-1	-3.0			
N WALLACE CORP SERVICE	23-38	35 1/4	-1 1/8	-3.0			
COMPUTER SYSTEMS							
D ALPHA MICROSYSTEMS	8-24	8 1/8	-1/8	-2.0			
D ALTOS COMPUTER SYST	7-21	8 7/8	0	0.0			
A ANDAL CORP	10-18	11 1/4	-5/8	-5.2			
D APPLE COMPUTER INC	18-63	13 5/8	-1/8	-0.7			
N AT&T	15-24	23 7/8	+3/8	+1.5			
N BURROUGHS CORP	48-68	56 1/4	-3 1/8	-5.2			
D COMPAQ COMPUTER CP	4-15	8 1/8	+5/8	+8.3			
D COMPUTER AUTOMATION	3-17	5	-3/4	-13.0			
A COMPUTER CONSOLES	5-20	5 1/4	-1 1/2	-22.2			
N CONTROL DATA CORP	25-38	24 5/8	-3 1/8	-11.2			
D CONVERGENT TECHNOL	5-41	5 1/8	-7/8	-14.5			
N CRAY RESEARCH INC	38-82	78 1/8	-3/8	-0.4			
D DAISY SYSTEMS CORP	14-36	22 1/2	-1/4	-1.0			
N DATA GENERAL CORP	33-74	33 1/8	-1 1/4	-3.6			
N DATAPoint CORP	12-28	11 7/8	-2	-14.4			
N DIGITAL EQUIPMENT	77-125	88 7/8	-4 5/8	-4.8			
A EECO INC	12-18	13 3/8	-7/8	-8.1			
N ELECTRONIC ASSOC.	3-7	4 3/8	-1/4	-5.4			
N FLOATING POINT SYST	13-31	25 1/2	+1/4	+0.8			
N FOXBORO	25-38	25 1/4	-1 1/2	-5.8			
SOFTWARE & EDP SERVICES							
D ADVANCED COMP TECH	2-8	3 1/4	-1/4	-7.1			
N ADVANCED SYSTEMS INC	8-22	11 1/4	+1/2	+4.5			
N AOS COMPUTERS INC	10-32	13 5/8	-5/8	-4.3			
D AMERICAN SOFTWARE	8-20	12 1/2	+1/4	+2.0			
N ANACOMP INC	1-5	2 3/4	-5/8	-18.5			
D ANALYSTS INTL CORP	5-17	10	0	0.0			
A APPLIED DATA REG	18-38	34 1/4	+1/2	+1.4			
D ASHTON TATE	6-15	8 7/8	-1/4	-2.7			
D ASK COMPUTER SYSTEMS	11-24	10 3/4	-1/2	-4.4			
D ASTRODYNE COMP INC	1-7	3	0	0.0			
N AUTOMATIC DATA PROC	30-48	48 1/2	0	0.0			
D COMPUTER ASSOC INT'L	15-35	25 1/2	+3/4	+3.0			
D COMPUTER HORIZONS	8-20	8 5/8	-1/2	-5.4			
D COMPUTER NETWORK	5-11	8 1/4	+1	+13.7			
N COMPUTER SCIENCES	11-17	18 5/8	+3/8	+2.3			
D COMPUTER TASK GROUP	8-16	14 1/4	+3/4	+5.5			
D COMPUTER USAGE	1-18	1/4	0	0.0			
D COMPUTONE SYSTEMS	4-23	6 1/2	+1/8	+1.8			
D CONSERV CORP	1-16	3 3/8	-3/8	-10.0			
D CONSHARE	6-14	8 3/4	0	0.0			
N CULLINET SOFTWARE	12-33	24 1/4	+1 1/2	+8.5			
D CYCARE SYSTEMS INC	16-27	21 3/4	-3/4	-3.3			
D HOGAN SYSTEM INC							

EXCH: N=NEW YORK; A=AMERICAN; P=PACIFIC; B=BOSTON;
L=LOS ANGELES; M=MIDWEST; O=OVER-THE-COUNTER
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